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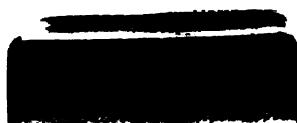
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ANNUAL REPORT

OF THE

State Engineer and Surveyor

OF THE

With the Compliments of



State Engineer and Surveyor.

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15, 1907

ALBANY
J. B. LYON COMPANY, STATE PRINTERS
1907

ANNUAL REPORT
OF THE
State Engineer and Surveyor
OF THE
STATE OF NEW YORK

For the Fiscal Year Ending September 30, 1906



TRANSMITTED TO THE LEGISLATURE JANUARY 15, 1907

ALBANY
J. B. LYON COMPANY, STATE PRINTERS
1907

STATE OF NEW YORK

No. 19.

IN ASSEMBLY

JANUARY 15, 1907

ANNUAL REPORT

OF THE

State Engineer and Surveyor

OF THE

STATE OF NEW YORK

OFFICE OF THE STATE ENGINEER AND SURVEYOR,

ALBANY, N. Y., *January 15, 1907.*

To the Honorable the Speaker of the Assembly:

Sir.—I have the honor to transmit herewith the annual report of my predecessor, Hon. Henry A. Van Alstyne, for the fiscal year ending September 30, 1906.

Very truly yours,

FREDERICK SKENE,

State Engineer and Surveyor.

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OFFICE OF THE STATE ENGINEER AND SURVEYOR,
ALBANY, N. Y., *December 31, 1906.*

Hon. FREDERICK SKENE, *State Engineer and Surveyor-elect:*

Sir.— I enclose herewith for transmittal to the Legislature my
annual report for the fiscal year ending September 30, 1906.

Very truly yours,

HENRY A. VAN ALSTYNE,
State Engineer and Surveyor.

REPORT.

To the Honorable the Legislature of the State of New York:

I have the honor to present herewith my third annual report as State Engineer and Surveyor of New York.

The report gives the details of the manner in which this Department has carried out the duties with which it is charged by the provisions of the Constitution of the State, by the Revised Statutes, and by laws passed at each session of the Legislature. In general these duties comprise the design and supervision of the engineering operations required in the construction and maintenance of the public works of the State. These works, together with the duties and responsibilities connected with them, are constantly increasing in variety and extent.

In former years the principal duty of the State Engineer and Surveyor was connected with the State canal system, and in the present period of improvement this still continues to be his chief responsibility, and involves the design, construction and maintenance of the canals, and all such extensions and enlargements thereof as may be required by the Legislature and by the people of the state.

Within the last decade the work of the State Engineer and Surveyor has been largely augmented by the improvement of public highways, which the State has undertaken. Making the surveys, preparing the plans, awarding contracts and supervising the construction of improved highways throughout the state, under the provisions of chapter 115 of the laws of 1898, and supervising the maintenance of these improved highways, are duties of which the State Engineer and Surveyor has sole charge, resulting in the construction by State aid of important and useful public works, which are gradually reaching all counties of the state, many of which have not heretofore received the direct benefits of State expenditures. As a result of the manner in which the building

of highways has been conducted by this Department, this is becoming one of the most important branches of State work, and the one which attracts the greatest amount of public attention.

Additional duties devolve upon the State Engineer and Surveyor by reason of his membership of various boards and commissions, from which many subjects are referred to him for examination and report.

These boards and their duties are as follows:

The Canal Board.—Controlling the construction and maintenance of canals.

The Board of Commissioners of the Land Office.—Controlling the sale and purchase of State lands, and the granting of lands under water.

The Board of State Canvassers.—Canvassing the returns of elections.

The Board of Equalization of Assessment.—Equalizing the assessment of State taxes among the several counties.

The statement of engineering expenses for all kinds of work under the supervision of the Department during the fiscal year and of the completed and pending contracts for the various works appears at page 41 of this report, and is also given in detail in the appended reports of the three division engineers at pages 126, 195 and 242.

CANAL MAINTENANCE.

During the past year the maintenance of the present canal system has been continued under the provisions of the usual and special acts of the Legislature, the design and construction of the various works specified by these acts having been carried on under the direction of the State Engineer.

As in the past, the specifications have been modified wherever necessary in order to be kept abreast of the times and in accord with the latest and most approved methods employed by engineers on the design and construction of similar works. The preparation of these standard specifications has received continued attention.

One of the recognized features of modern and improved construction, is the constantly increasing use of Portland cement

concrete as a substitute for the more expensive cut-stone masonry, which was formerly used. Concrete is now generally specified for masonry structures and the requirements and the tests of Portland cement have been advanced and modified to accord with the great improvement made in recent years by American manufacturers, with the result that none but the best qualities of cement are used on State work. The best laboratories in this and other states have been visited, and their methods considered and adopted where it was thought desirable, so that the State now possesses one of the best laboratories in the country.

HIGHWAY IMPROVEMENT.

Following the example set by New Jersey in 1891, Massachusetts in 1893 and Connecticut in 1895, New York State inaugurated a new departure in road administration in 1898—that of State aid in road construction and maintenance. The Legislature of 1898 enacted the Higbie-Armstrong and Fuller-Plank laws. These laws have worked radical changes in highway improvement, and are destined to become still more important and to promote the general prosperity and welfare of the State. With the subsequent amendments and supplemental laws, they provide a wise, comprehensive and systematic plan for the improvement of the wagon roads of the state. The framers of these laws were wise enough not to attempt to revolutionize in a day a system that had existed for a century or to force a new method upon the conservative, rural towns against their wishes. These State aid laws are not mandatory, but become operative only at the option of those concerned,—on the request of the board of supervisors of a county in case of the Higbie-Armstrong law, and by a majority vote of the town desiring the money system of maintenance in case of the Fuller-Plank law.

HIGBIE-ARMSTRONG LAW.

Through the Higbie-Armstrong law the State offers to pay fifty per cent of the cost of construction as an inducement to every county to improve its more important highways. It also

provides that thirty-five per cent of the cost shall be a general county charge, while the remaining fifteen per cent must be borne either by the town in which the road is located, or by the owners of adjacent lands. It must be remembered that prior to the year 1898 the town had to pay the entire cost of any highway improvement within its limits, instead of having to pay but fifteen per cent as now provided. Thus the State supplies, through the Higbie-Armstrong law, the necessary machinery, but it has left to the option of each county as to whether or not the machinery shall be placed in operation. If the county desires to accept the invitation to have any particular portion of road improved, the county, through its board of supervisors, requests the State Engineer to survey the road and to prepare plans, specifications and an estimate of the cost of the improvement. When the plans and specifications are prepared by the State Engineer, they are submitted to the board of supervisors, and, if satisfactory, they are approved by them and an appropriation is made for the county's share of the cost. When the State's share of the cost is made available by the Legislature, a contract for the improvement of the road is awarded to the lowest responsible bidder, after due advertisement for two weeks in a paper published in the county seat of the county wherein the road is located and in other State papers. The town or county may bid for the work and, if they are the lowest bidders, may take the contract and construct the road and have the State pay one-half of its cost.

Under the Higbie-Armstrong law, up to October 1, 1906, 9,068 miles of road have been petitioned for by the boards of supervisors of fifty counties.

Three thousand eight hundred and sixty-one miles of road have been surveyed.

Plans for 2,570 miles of road have been prepared by the State Engineer.

The plans and specifications for 2,250 miles of road have been approved by the State Engineer and the counties' share of the estimated cost has been appropriated.

One thousand two hundred and sixty miles of road have already been improved or are now being improved.

Comparison of Progress During Period in which the State Aid Law has been in operation in New York State, October 1, 1906.

DURING YEAR.	Total State appropriations.	Total appropriations by counties.	Total mileage covered by first petitions to date.	Total mileage of roads adopted by counties.	Total mileage of completed improved roads.
1898.....	\$50,000	\$63,872	502	21	0
1899.....	50,000	42,876	157	9	5
1900.....	150,000	431,227	155	130	35
1901.....	420,000	1,055,874	495	247	20
1902.....	795,000	1,748,115	1,108	418	126
1903.....	600,000	2,198,623	1,728	427	112
1904.....	1,108,285	2,032,855	1,323	422	158
1905.....	50,000	480,000	127	118	100
1906.....	5,000,000	2,101,132	3,475	458	84
Total.....	\$8,223,285	\$10,154,574	9,068	2,250	641

The 75,000 miles of wagon roads of New York state were, for the most part, originally located and constructed and have heretofore been maintained without any systematic or intelligent plan which would enable the people paying for and using them, to obtain the best possible results for the amount of money expended. For the first time in its history, the State of New York is now, however, fairly started upon a systematic and carefully considered plan for the construction, maintenance and repair of her roads. Nearly seven and one-half millions of dollars have been expended during the past seven years in the improvement of these main highways and nearly fifty millions of dollars more are available for this purpose, should the Legislature see fit to authorize bonds to be sold. If the next Legislature approves the State Highway Map designating the main market roads which are to be improved by State aid under the fifty million-dollar bond issue, we may feel assured that within the next ten years her main highways will be improved. Surveys and plans for the improvement of about 2,250 miles of these main roads have been approved by the various boards of supervisors throughout the State. Of these 2,250 miles, about 800 miles have been constructed and, in addition thereto, between 500 and 600 miles are under contract and will be completed during the coming year.

One million dollars' worth of bonds have been sold under the fifty million-dollar bond issue authorized by the people. Between five and six million dollars' worth of work, providing for over six

hundred miles of road have been contracted for, and about one-half a million dollars have actually been expended, in partial or monthly payments.

Improved roads have been petitioned for in every county of the state outside of Greater New York, except three. If the present plans are carried forward, it is probable that the main highways of each county will have been improved within a decade and these, when joined to those of adjacent counties, will constitute a State system which will place every farm in the state within a few miles of some main road in this system. In the improvement of these main roads, wherever it is of advantage to do so, the faulty locations over hills or into deep valleys with steep grades have been improved as far as possible and the drainage has been made as nearly perfect as conditions will permit. This has involved on most roads the replacing of nearly every wooden culvert with a substantial masonry structure, and a macadam or gravel surface has been provided.

For the maintenance of these main highways a law has been enacted which places their care under the charge of the State Engineer. It is to be hoped that after this year the Legislature will make sufficient appropriations to permit all of these main roads to be maintained in suitable condition so that the expense of this work to the towns will not exceed fifty dollars per mile.

FULLER-PLANK ACT.

In the year 1898 section 53 of the Highway Law was placed upon the statute books. This act provides that every town which has by vote of the electors decided to adopt the money system can receive State aid to the extent of fifty cents on each dollar annually raised by tax, to be levied and collected the same as any other town tax, for the repair of its highways. The moneys thus raised by the town, together with the amount of State aid to which the town is entitled, are placed in the hands of the supervisor, who is the custodian thereof and is required by the provisions of this act to file a proper bond, or undertaking, with the town clerk. This money is to be expended by the supervisor upon the written order of the highway commissioner for the improvement, repair and

maintenance of the public highways in such manner as the town board and highway commissioner may determine and direct.

The year following the enactment of this law forty-three towns in this state adopted the money system. These towns have a total mileage of 3,696 miles and the amount of State aid paid was \$34,517. In the year 1906, 468 towns were working their highways under the money system with a mileage of 38,857 miles and the State was called upon to pay to these towns \$594,591.21. From reports already received it is estimated that in 1907 over 600 towns will have adopted the money system and will be improving the highways of the towns representing over 50,000 miles of road. It will, therefore, be seen that rapid progress has been made during the last eight years, and the following table will show the results from year to year since this act was placed upon the statute books:

YEAR.	Number of counties benefited.	Number of towns re- ceiving State aid.	Number of miles of highways under the money system.	Amount of State aid paid to the towns.	Amount expended. by towns.
1899.....	8	43	3,696	\$34,517 00	\$138,070 00
1900.....	14	75	6,497	54,057 00	222,767 00
1901.....	21	100	7,521	67,655 00	269,994 00
1902.....	24	139	11,681	102,509 00	419,491 00
1903.....	44	258	24,372	272,249 00	672,734 00
1904.....	51	370	30,952	393,493 00	917,873 00
1905.....	54	416	36,100	483,355 27	1,062,803 22
1906.....	56	468	38,857	594,591 25	1,206,462 38
Total.....	.....	.....	.....	\$2,002,426 52	\$4,910,194 60

In the annual reports of the Comptroller of the State for the fiscal years ending September 30, 1902, and September 30, 1903, it was recommended that, on account of the large and constantly increasing contributions on the part of the State for highway improvement under the provisions of this act, there should be some State supervision of the expenditure. In these recommendations it was stated that it would seem proper that the State Engineer and Surveyor should be consulted as to the manner in which the highways are to be repaired and also that he should have supervision over the expenditure of the moneys appropriated for such repairs. As a result sections 55-b and 55-c and other amendments to the Highway Law were enacted, which require the State Engi-

neer and Surveyor to issue directions to supervisors, highway commissioners and other officers of the towns, which have adopted the money system, for the improvement, repair and maintenance of the public highways.

In 1904 Bulletin No. 7 was prepared, which contained such directions as seemed necessary at that time. Bulletin No. 10 was prepared and issued during the year 1905 and contained additional directions and information, and in 1906 Bulletin No. 12 was issued, containing directions and information for the guidance of all town officials in carrying on this work in money-system towns.

Section 27 of the Highway Law was enacted in 1906 and provides that the supervisor and highway commissioner or commissioners of every town which has adopted the money system shall annually, in the month of November, make a verified report to the State Engineer and Surveyor in a form to be prescribed by him, showing the total amount of money received during the preceding year for the construction or maintenance of highways or bridges and for other highway purposes, indicating the sources thereof together with all expenditures for the improvement, repair and maintenance of highways, for the repair and maintenance of bridges, for the construction of new bridges, for damages and charges in laying out or altering highways, for the removal of obstructions caused by snow, for the purchase of machinery, tools and implements, for highway commissioner's salary or per diem allowance, or for any other highway purpose, and also showing the machinery, tools and implements owned by the town and the districts thereof and the value of the same.

Section 28, which was enacted at the same time, is to the effect that the State Engineer shall prescribe the form of blanks to be used by the highway commissioner and supervisor in keeping account of money received and paid out for highway or bridge purposes or for other purposes in connection with highways. This section also provides that the supervisor and highway commissioner shall use such blanks and forms as the State Engineer may prescribe. As a result, reports from all towns on the money system have been received and valuable data furnished for the information of those who are interested in highway improvement.

Town officers have been advised of the fact that it is the desire

of the State Engineer to assist and to co-operate with them in order that good practises may follow, and the users of the public thoroughfares in money-system towns were asked to co-operate. As a result, information has been received from citizens in various towns in the way of complaints, and in nearly all instances such complaints when received were promptly investigated. Thus the expenditure of \$1,206,462.38 raised by the towns, and in addition thereto \$594,591.25 paid by the State as State aid to money-system towns, has been more properly and wisely expended.

It is purposed during the coming winter to request the supervisors of towns which have adopted the money system to call meetings in the various towns, the morning session to be attended by members of the town board, at which time an inspection of the highway, bridge and miscellaneous accounts will be made and general instructions given as to the proper keeping of such accounts. The afternoon meeting is to be attended by the town officials and all citizens who may be interested in the improvement, repair and maintenance of the public highways, and at this meeting it is designed that the laws shall be defined and directions for the guidance of highway commissioners in money-system towns explained by a representative of the State Engineer's Department, who will be prepared to answer any questions which may be asked in relation to this subject.

RECOMMENDATIONS.

Prison Labor for Highway Improvement.

The last Legislature authorized the appointment of a commission and made an appropriation for the purpose of establishing a new State prison site at such a location that able-bodied male prisoners could be employed in crushing trap rock for use on the highways of the state. No provision, however, was made in this act permitting the commission to condemn a site where trap rock was available, and the amount of the appropriation was not sufficient to purchase a site of the acreage required in the act.

I would recommend that the defects of this bill be corrected at the next session of the Legislature and that such legislation be enacted as may be necessary to permit prisoners confined in county

jails, together with such prisoners as may wisely be selected from the State prisons, to be transferred to the prison having the proposed trap-rock crushing plant, and that the product of this plant be made available for maintaining the main roads in those counties of the state where this trap rock can be shipped at reasonable rates. A site for this prison can be found without in any way interfering with the scenic beauty of the Palisades and the unskilled labor necessary in this work will not interfere with the work performed by the skilled labor organizations of the state.

Money System of Maintenance.

I would recommend that those towns which have not adopted the money system by a vote of their citizens, be placed under this system by act of the Legislature, in order that a uniform practice may prevail over the entire state.

Highway Commissioner.

I would also recommend that only one highway commissioner be permitted in each town, as it has been my experience that the best results are secured by having one responsible head to care for the roads of each town, rather than to have a division of authority as now exists in 114 towns.

Corporate Interference with Public Rights.

Like everything else belonging to the public, private interests have, in many cases, encroached upon the rights of the public in the highways of the state.

I would strongly recommend that no electric railway, telegraph, telephone or water company or other corporation or individual, be permitted to use, occupy or in any way encroach upon the rights of the public to the highways of the state, unless it is under a revocable permit issued by the town and State authorities and containing such conditions and restrictions as these authorities may see fit to impose in order to protect the rights of the public in their own property, and that the necessary legislation be enacted to enable the authorities to enforce the conditions of such permits and to punish violations of the law in regard to encroachments.

Power to Prosecute.

In many cases roads that have been constructed with great care and expense by the State have been seriously damaged and injured by the use of heavy loads on narrow tires and also by individuals carrying or dragging enormous weights, such as boilers, logs and other heavy materials, over the roads in such a way as to injure them; also by the users of adjacent property filling up ditches and culverts and interfering with the drainage of the road.

I would recommend that such legislation be enacted as will permit the State and town authorities to protect these roads from wanton damage and injury.

Shade Trees.

Although the State Engineer now has authority to plant shade trees on most of the improved roads of the state, the public has an easement only and the abutting property owner has title to the land to the center of the road. These property owners have, in some cases, wantonly destroyed the trees planted by the State Engineer and I would recommend that some legislation be enacted preventing the abutting property owners, telegraph or telephone companies, or any one else from mutilating or destroying the shade trees planted or growing along the sides of our public roads.

State Roads in Incorporated Villages.

In many instances, in constructing through roads across the state, it is impossible now to connect these roads through incorporated villages where the distance to be connected is greater than one mile.

I would recommend that this minimum distance of one mile be increased to at least three miles.

Town Bridges.

I desire again to call attention to the fact that, under section 145 of the Highway Law, no town or its officers can be compelled to accept or pay for any iron or steel bridge exceeding 200 feet in length, or having a span or spans exceeding 100 feet in length, until the State Engineer and Surveyor shall certify to the comple-

tion of the bridge, pursuant to the contract under which it shall have been constructed.

The provisions of this law are usually evaded in practice, and it affords very little protection to the taxpayers of the various towns. I recommend that this law be amended in such a way as to require the approval by the county engineer, where there is one, and by the State Engineer, of the plans and specifications of every bridge contracted for by the town that exceeds \$500 in cost. Also, that, after the approval of such plans, the contract for every bridge be awarded to the lowest responsible bidder, based upon the approved plans therefor, after the same has been properly advertised in two papers published in the county in which the bridge is located, and also in some paper devoted to engineering and contract work published within the state.

The law should also provide that the contractor shall not be paid for any bridge until the final estimate for the same has received the approval of a majority of the town board, the county engineer and the State Engineer.

Highway Law.

Prior to 1898 no State aid had been contributed for the construction, repair or maintenance of public highways, and the general Highway Law (chapter 568, Laws of 1890), and the numerous amendments made thereto from year to year, all applied to the care of highways under the prevailing conditions. By the passage in 1898 of the Higbie-Armstrong act and of the Fuller-Plank act, or Money System act, the former providing for the construction of improved roads by State aid and their maintenance, and the latter for a contribution by the State toward the maintenance of improved roads, three distinct conditions prevail, namely:

A.—The repair and maintenance of roads in towns under the labor system.

B.—The repair and maintenance of roads in towns which have adopted the money system.

C.—The construction, repair and maintenance of roads which have been improved under the Higbie-Armstrong act.

Many sections of the original Highway Law are rendered ineffective by, and many more conflict with, the provisions of the Higbie-Armstrong and Money System acts, resulting in great con-

fusion and uncertainty on the part of the State and local authorities in endeavoring to perform their duties in regard to the public highways.

I, therefore, recommend the passage of a new act to be known as the Highway Law, and which will contain all the laws relating to the construction, repair and maintenance of public highways under the present conditions and will repeal all unnecessary or conflicting laws which may now be in force.

CEMENT TESTING FOR STATE WORKS.

The State Engineer's Department includes a State testing laboratory where are made tests of all hydraulic cements used for State work, not only for those works which are under the direction of the State Engineer's Department but also for those directed by the State Architect, for the many buildings which he constructs. The methods used are in accord with the latest and best practice, and in a new and fully-equipped laboratory. The assistant engineer who is in charge of it has made visits to all the best-equipped laboratories elsewhere and keeps fully informed as to the latest and most-approved methods. These methods require that only the best cements can be used for State work.

The grade of these requirements has been raised during the year in order to keep up with the improved methods and products of American manufacturers of Portland cement. Detailed report of this Cement Testing Laboratory is given in the appended report of the engineer in charge, on page 259.

COURT OF CLAIMS SURVEYS.

In order that the Court of Claims may have a full knowledge of the claims which are brought before them for damages alleged to have been caused by the canal and by its works, engineers of this Department have made and presented surveys, maps and photographs on behalf of the State, and the evidence thus produced has resulted in saving to the State much money.

Detailed description of the work thus done will be found in the appended reports of the division engineers.

It is recommended that the Legislature appropriate \$15,000 for the continuation of this work.

LAND BUREAU.

This Bureau of the State Engineer's Department has charge of the sale of State lands under water and of the custody and care of ancient records. The ancient records of this Department, as well as the modern ones, are of great value for reference, and it has been the policy through recent years to add to them whenever this can be done without cost to the State. The report of the clerk of the Land Bureau, giving in detail the operations of the past year, is appended at page 265.

BUREAU OF BRIDGE DESIGN AND INSPECTION.

This Bureau is charged with the duty of making designs and plans for new bridges whenever the State Engineer is directed by the Legislature to prepare such plans. Since January, 1904, the greater part of the work of the bureau has consisted in preparing plans, specifications and estimates for the construction of bridge superstructures, substructures and approaches, lock-gates, lock-valves, needle-dams, movable-dams, etc., required for the building of the Barge canal.

The growth of the various cities situated upon the canals has created an increased demand for lift-bridges, which are of necessity much more expensive and intricate than were the fixed bridges which they replace. Prior to 1899 the plans for these bridges were prepared by various private engineering and bridge-contracting firms, but this method was found to lead to great confusion and undesirable variety in the resulting structures. Since 1899, when chapter 476 of the laws of 1899 provided for a chief bridge designer and inspector and necessary assistants, there has been uniformity in these designs and a thorough familiarity with them in this Department. The operations have thus been under the constant observation of the State Engineer, with most satisfactory results.

There are some 800 old bridges which have formerly been built across the canal and which are now maintained by the Superintendent of Public Works. The State Engineer is not authorized to make a regular and systematic inspection of these bridges, but, whenever a request is received from the Superintendent of Public

Works for the inspection of one of these bridges, such inspection is performed by the bureau of bridge design and inspection, which makes the plans for any repairs that may prove to be necessary.

This Bureau is also charged with the examination of plans for town and highway bridges, which are submitted to the State Engineer for his approval, and with the examination and approval of plans submitted by electric and steam railway companies for new bridges over the canals, or for strengthening existing bridges. I have already called attention to the need of approval of plans for town and highway bridges by the State Engineer, as well as his certificate to their proper completion. The detailed report of the chief bridge designer is appended at page 268.

SURVEY OF THE STATE IN CO-OPERATION WITH THE UNITED STATES GEOLOGICAL SURVEY.

The annual reports of this Department for several years prior to 1893 urged the passage of an act to provide for the co-operation of the State of New York with the United States Government for the purpose of securing an accurate topographic survey and map of the state of New York, which recommendation was finally adopted and the work authorized by chapter 287, Laws of 1893. From 1893 to the present time the work has been steadily progressed and is now rapidly approaching completion. The agreement between the United States Geological Survey,—the department having the matter in charge for the Federal Government — and the State Engineer's Department, acting on behalf of New York State, is that each shall pay one-half the expense of the surveys and the Federal Government shall pay all of the expense of engraving plates and printing the maps therefrom. The State's share of the cost is provided by annual appropriations by the Legislature, the United States Government contributing dollar for dollar to an amount equal to the appropriation made by the State.

The maps are printed in sheets about 20 inches by 16½ inches in size, on a scale of about one inch to the mile, and show all roads, waterways, mountains, hills and valleys, railroads, towns, villages, cities, etc. The state has been divided into 260 quadrangles, each shown on one sheet. At the present

time 195 quadrangles have been completed and the sheets printed, leaving 65 quadrangles in different stages of progress. No other map of the state has ever been published upon such a large scale nor in such detail, and the information afforded by these maps is of great value to the citizens at large and especially to several of the State departments — in connection with the work of highway improvement and with the operation of the Forest Preserve Board, and also in examinations which are constantly being made for water-supplies for existing and proposed canals and for the various cities and towns. These maps are in constant and growing demand by those who are planning any kind of work of improvement in the state, giving as they do the means of making, without the delay and expense of special field-work, preliminary locations for water storage and water-power development, railroad lines and highway improvement. The State has thus obtained maps of great usefulness and value at less than half their actual cost.

The operations of this survey are detailed at page 286 of this report and in the statement of the Hon. H. C. Rizer, acting Director of the United States Geological Survey, at page 283.

I recommend that the Legislature appropriate \$25,000 to continue the co-operation with the United States in this survey.

MEASUREMENT OF THE VOLUME OF STREAMS AND THE FLOW OF WATER IN THE STATE OF NEW YORK.

In 1902 the measurement of the volume of streams and flow of water was commenced by this State in co-operation with the United States Government, each bearing one-half the expense. The work was continued in 1903 and 1904, discontinued in 1905 and resumed in 1906. While these surveys do not equal in importance the topographic surveys of the state, yet the information obtained is of the greatest value to the citizens in connection with the establishment of water-power plants for commercial purposes and also of considerable value to this Department in connection with our Barge canal work. The expenditure each year has not exceeded \$1,500 on the part of the State and I believe

that the results obtained are well worth the cost. The detailed account of these gagings is appended as a supplemental volume to this report.

I recommend that the usual appropriation for this work — \$1,500 — be made by the Legislature.

STATE AND COUNTY BOUNDARY LINES.

By chapter 678 of the laws of 1892, the State Engineer and Surveyor is authorized and directed to make an examination every three years of all the monuments marking the boundary lines of the state; if any such monuments be found injured, missing or displaced, he is directed — acting in conjunction with the duly recognized authorities of the adjoining State — to replace such monuments. The total length of the state boundary line is 1,416 miles, comprised as follows: Canada line, 431 miles; Vermont line, 171 miles; Massachusetts line, 50½ miles; Connecticut line to Long Island Sound, 81 miles; along the ocean around Long Island to the New Jersey shore, 246 miles; New Jersey line, 92½ miles; Pennsylvania line, 344 miles to the beginning of the Canada line in the middle of Lake Erie. These boundaries are fixed by accepted agreements and are marked by natural water-courses or by monuments.

NEW YORK AND CANADA.

The boundary line between the State of New York and the Dominion of Canada runs through Lake Erie about 50 miles to the head of the Niagara river, through the Niagara river about 34 miles to Lake Ontario, through Lake Ontario about 175 miles to the head of the St. Lawrence river, thence northeasterly through the St. Lawrence river about 108 miles to a point 150 feet north of latitude 45 on the bank of the St. Lawrence river, which thus far is the boundary of the State of New York and the Province of Ontario; thence easterly 64½ miles to a point on the Richelieu river at the outlet of Lake Champlain, 4,200 feet north of latitude 45. This section is the boundary between the State of New York and the Province of Quebec.

The last-described portion of the line, from the St. Lawrence river to the outlet of Lake Champlain, was intended to follow the

forty-fifth parallel. It was so mentioned in 1606 in a patent by King James I, describing this as the northern limit of certain territory, a part of which afterwards became New York state. By a proclamation of October 7, 1763, latitude 45 was also fixed as the boundary between the Province of Quebec and the State of New York. This line was surveyed by Valentine and Collins in 1773 and 1774, who endeavored to run the line on the forty-fifth parallel, as called for, but, as afterwards discovered, failed to do it accurately.

By the treaty of Paris in 1783 the forty-fifth parallel was recognized as the northern boundary of this part of the State of New York. By the treaty of Ghent, December 24, 1814, the same line was recognized as the boundary and its resurvey was provided for. This was done by an international commission in 1818-19. It was then found that the line of 1773-4, as run by Valentine and Collins, did not follow the forty-fifth parallel, but was 151 feet north of it at the St. Lawrence river, and that it crossed the parallel to the southward four miles east of the St. Lawrence river, being 2,506 feet south of the parallel $17\frac{1}{2}$ miles east of the St. Lawrence river, and again crossing the parallel to the northward at 35 miles east of the St. Lawrence river it was 4,200 feet north of it at the outlet of Lake Champlain. Had the line as then run been adopted, it would have thrown some fortifications, which the United States had erected on the side of the Richelieu river, into Canadian territory.

By the treaty of Washington in 1842 the old line of Valentine and Collins, as run in 1773-4, was adopted instead of the forty-fifth parallel, and this line was retraced, established and monumented by the international commission in 1846-7. It was marked by two stones near the Richelieu river, one stone on the bank of the St. Lawrence river, and 127 cast-iron monuments set irregularly on the intervening $64\frac{1}{2}$ miles. The cast-iron monuments were fragile and insecurely set, and in 1901 it was found that many of them were missing and others broken. Co-operation was then secured by this Department with the Canadian Government in 1902, and in 1903 the line was retraced and 146 new granite monuments (the bases placed in concrete) were set in place of the old monuments.

NEW YORK AND VERMONT.

The boundary line between the States of New York and Vermont was originally established by commissioners of both States, whose report was submitted to the Legislature of each State in January, 1814. The southerly end of this line is at a point about one-half mile west of the northwest corner of the State of Massachusetts and runs northerly 54.6 miles to the Poultney river, thence down the Poultney river and Lake Champlain 116.4 miles to the forty-fifth parallel of latitude. The land portion of this line was originally marked by 33 marble monuments, the general condition of which in 1903 was so unsatisfactory that, co-operation having been secured between the State of Vermont and this Department, the line was retraced and remonumented. One hundred and one granite monuments six feet long, the bases set one foot in concrete, and the sides properly lettered, were used in remonumenting this line.

NEW YORK AND MASSACHUSETTS.

The New York and Massachusetts line, from the northerly boundary of the State of Connecticut to the southerly boundary of the State of Vermont, was originally determined by commissioners appointed by Congress in 1787 and was at that time marked by stone heaps, stakes and crosses cut in rocks. The clearing and developing of the country through which the line passed destroyed many of these stone heaps and stakes, so that in many cases along the line the location was uncertain. In 1897, 1898 and 1899 the line was resurveyed and remonumented by this Department in connection with the officers of the topographical survey of the Commonwealth of Massachusetts and is now marked by 121 monuments, of which number 83 are granite and 38 iron.

NEW YORK AND CONNECTICUT.

The New York and Connecticut line, from Long Island Sound to the southerly line of the State of Massachusetts, a distance of about 80 miles, was disputed for nearly 200 years until 1860,

when it was established by a commission representing the State of New York. It was then marked by 100 monuments of marble and iron, the condition of which at present, as disclosed by a recent examination made by a representative of this Department, is unsatisfactory. I have been in communication with the proper authorities of the State of Connecticut in relation to the remonumenting of this line and am in hopes that they will consent to join with the State of New York during the coming year in placing the line in a proper condition.

NEW YORK AND NEW JERSEY.

The portion of the line crossing land under water in Raritan bay, about 16 miles, was established by commissioners of both States in 1887 and was then marked by eight buoys and three range monuments. Shortly after the buoys were set, they were carried away by the heavy ice coming down the bay in the spring. The monuments are in good condition. The loss of these buoys rendered it difficult to locate the line in the bay, so that many disputes arose between the men engaged in the shell-fishing industry in this locality. In 1904 a large steel beacon, to be used as a range monument, was erected on the uplands of New Jersey in an extension of the boundary line in the bay, so that now it is possible readily to find the line.

The portion of the line lying across lands under water in Kill-von-Kill and Arthur Kill, about 18 miles, was established by commissioners of both States in 1888 and was then marked by 56 range monuments. Most of them are now in good condition.

The portion of the boundary line through New York bay and the Hudson river, 25 miles, is marked by ranges along the shore of the river on the various landmarks, all of which were established by commissioners of both States in 1891.

The portion of the line from Hudson river to the Delaware river at Port Jervis, a distance of $48\frac{1}{2}$ miles, was established by commissioners of both States in 1774. It was rerun in 1884 and 1885 and was then marked by 120 granite monuments, the condition of which at present is satisfactory.

NEW YORK AND PENNSYLVANIA.

The New York and Pennsylvania line was originally established by commissioners of both States in 1774, 1776 and 1787, and was then marked from the Delaware river at the forty-second parallel of north latitude to the shore of Lake Erie by about 250 monuments. The old line was rerun under the direction of commissioners of both States in 1876 and 1885, and was marked by 570 new granite monuments. The report of an examination of these monuments, made by a representative of this Department in 1906, will be found at page (305) of this volume.

COUNTY BOUNDARY LINES.

In 1899, owing to many disputes that were arising concerning the location of county lines in the Adirondacks, the work of their survey and location was entrusted to this Department. These county lines had been established by statute for more than one hundred years, but never actually located on the ground. The following county lines have been surveyed and marked by steel monuments: Herkimer-Lewis, Herkimer-Hamilton, St. Lawrence-Herkimer, St. Lawrence-Hamilton, Franklin-Hamilton and Franklin-Essex.

BARGE CANAL.

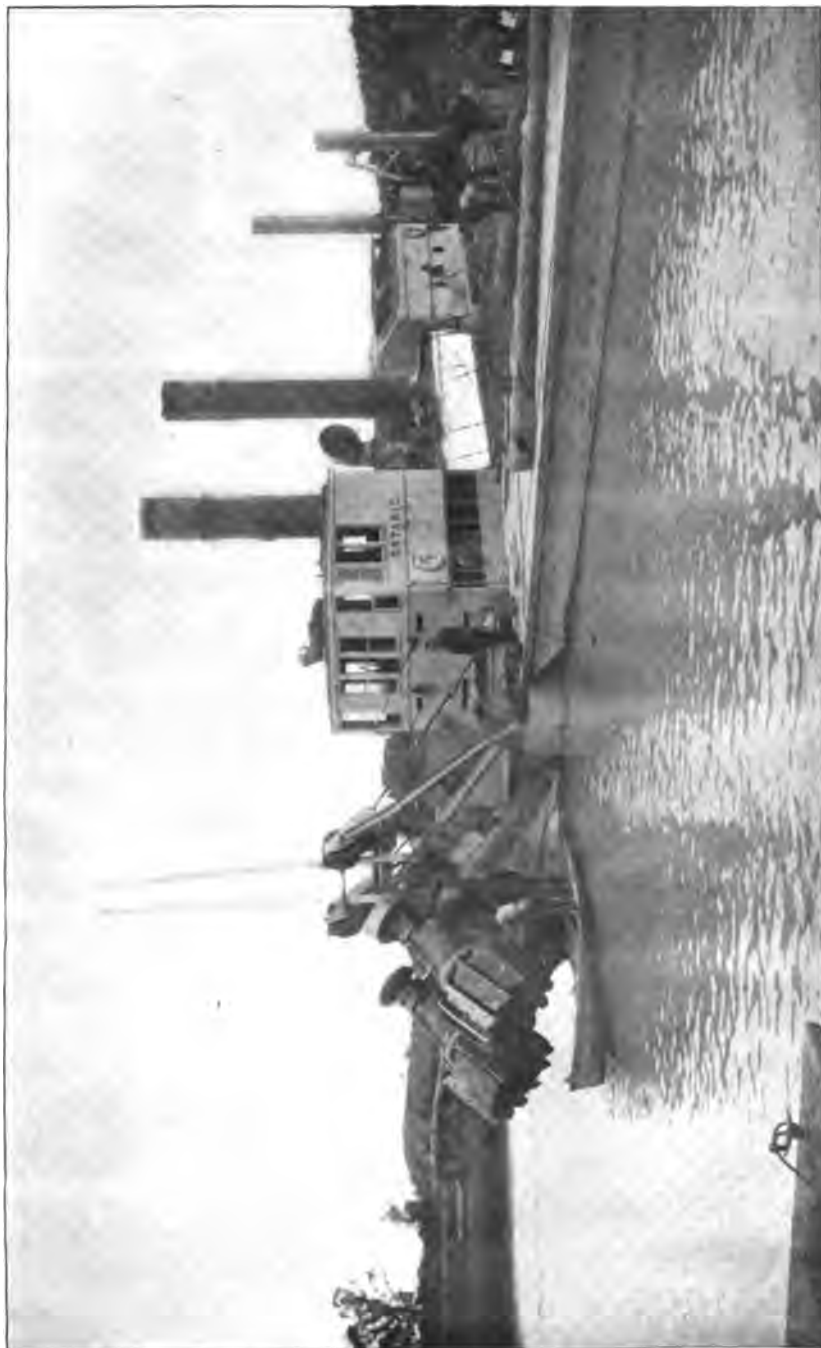
GENERAL PLAN.

No small part of New York's right to the proud title of "Empire State" is directly attributable to her early and constantly-maintained policy of improving her internal communications. The State has reason to feel pride in the example it set, soon after the colonial days, in constructing a waterway which excited the admiration of the world and which for many years stood as the model for canal-building. This was accomplished entirely with the State's own resources, and at a time when the undertaking was denounced as visionary and impracticable and seemed so gigantic as to stagger popular faith in our ability to consummate it; at a time also when President Jefferson declared that it was a century ahead of its day, saying that to think then of

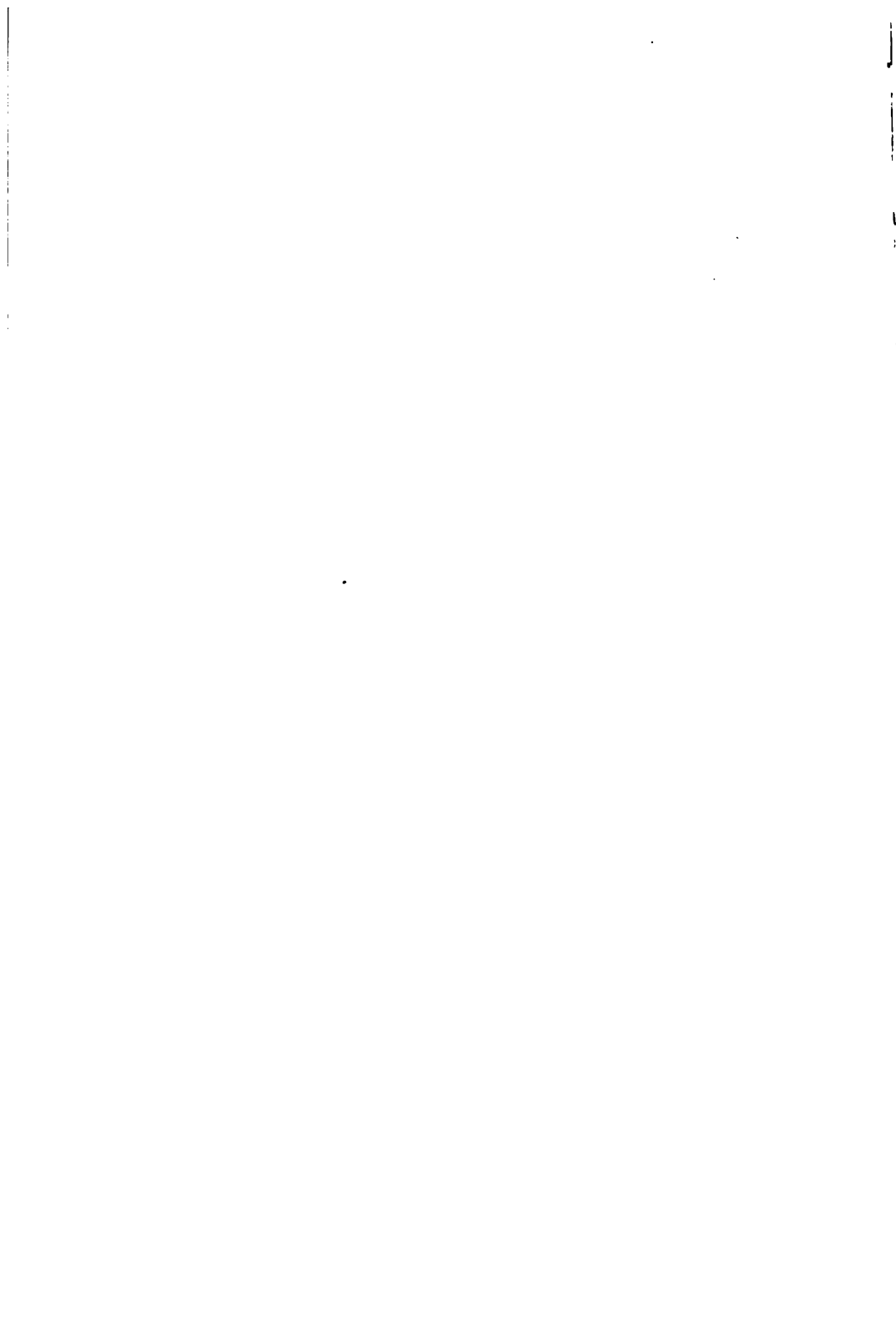
making a canal of three hundred and fifty miles through a wilderness was "little short of madness"; when Madison, too, thought that its cost would exceed the resources of the whole country, and, as one of his last official acts, vetoed a measure to grant National aid; and when in derision it was said that in Clinton's "big ditch" would be buried the treasure of the State, to be watered by the tears of posterity."

When New York began the original Erie canal in 1817, the State took the lead of the whole country in constructing waterways, and now in the third enlargement of the channel, it still leads, emulating the General Government in the magnitude of its operations. Twenty-five years before the State began its first canal, a private company had attempted to open a water communication to the interior, but the work was too great for the resources of the company and the benefits of its operations were somewhat limited. On July 4, 1817, the first shovelful of earth was excavated for the original canal with fitting ceremony, and on October 26, 1825, a line of cannon along the canal and the Hudson river carried the news from Buffalo to New York, that the enterprise was completed and that a fleet of boats, bearing the Governor and many distinguished citizens had entered the canal from Lake Erie to embark on a triumphal journey across the state, which culminated in a land parade and a naval pageant that were said to be without parallel in the world's history. Thus extravagantly did the early builders celebrate the completion of a channel which was but twenty-eight feet wide at the bottom, forty feet at the water-surface, with a depth of four feet. But their joy was well founded, for success followed the opening of the route, which far exceeded their wildest hopes, and a veritable mania for canal-building spread over the whole country. The New York Legislatures were besieged with petitions for canals in all suitable and many unsuitable places throughout the state; a single act of the Legislature of 1825 ordered the surveys of seventeen separate canal routes. The Erie engineers were called to similar enterprises in Maine, Ohio, Pennsylvania and other states, to Canada, and even to the West Indies.

The canal had been in operation less than a decade, when the need of greater facilities was urgently felt, and its enlargement



BARGE CANAL, CONTRACT NO. 5.
View of hydraulic dredge with cutters raised.



was ordered in 1835. The new channel had a width of seventy feet at water-surface and a depth of seven feet. The work was begun in 1836, but it was not finished until 1862. By this time a second enlargement was being agitated, though nothing of a radical nature was accomplished until 1884, when the plan of increasing locks to twice their former length was begun, the prism, however, remaining unchanged. In 1895 the State sanctioned a second enlargement, which, because of an inadequate appropriation, was but partially accomplished. The consequent deliberations concerning the proper policy for the State to pursue ended in the determination for a third enlargement, rather than the completion of the second. This conclusion was embodied in chapter 147, Laws of 1903, which, after ratification by the people, authorized the construction of what is known as the Barge canal. Now again New York may feel pride in the lead which she is taking in the remodeling of her waterways to meet a demand which seems to be sweeping over the whole world — a demand to provide a means of transportation by water which shall so lessen rates as to control competition with railroads.

The methods of canal-building are greatly changed from those employed by the early projectors. The first improvements in this country were generally in the beds of natural streams, but these presented difficulties which induced the practice of building independent channels. Then came the period of excessive canal schemes, during which several lateral branches were built along routes of such great differences of elevation as to be poorly adapted for economical construction and maintenance, and which, moreover, joined no large industrial centers and tapped no great productive regions. On the first waterways the craft were moved up-stream by poling, the boats being supplied with running-boards on the sides of the hulls for this purpose. When the State undertook the work, towing-paths were the invariable rule, and not till fifty years after the completion of the Erie was the problem of adapting steam propulsion to navigation on restricted channels solved with any degree of success. It is recognized now that a prosperous canal must be of large dimensions and must connect existing systems of transportation, or tap industrial centers or territories of large natural supplies. Engineering experience has

overcome the difficulties of regulating the flow in natural streams and has placed the canals back in the beds of rivers. It has also made possible the use of locks of high lift and has produced cheap methods of mechanical propulsion. The result is that the Barge canal is to follow the routes of natural travel, in use even before the advent of the white man — routes which Nature has supplied to New York and which are unequaled throughout the land. The old towing-path with its animal power will be missing on the new canal.

Immediately following the opening of the original Erie canal, there began a most remarkable era of growth and advancement in the material affairs of New York state. New York city increased rapidly in population and wealth; the western portion of the state grew quickly to be a populous and very productive region; the whole state felt the impetus of increasing life and vigor in farming, manufacturing and commerce; and the western territory was soon converted into flourishing states. Doubtless the time was ripe for large material advancement in the new and undeveloped Republic, but it is easily conceivable that the development would have been many fold less and much delayed, but for the presence of canals. New York was fortunate in possessing the only feasible route in the Union between the Great Lakes and the Atlantic, and in building her first canal at the right time to precipitate this era of growth and prosperity and to reap the full harvest of its maturity. This experience can never be repeated in any part of the world, for canals no longer afford the sole means of cheap transportation, but the lessons derived from the reconstructed canals of Europe for the past twenty-five years teach us that a properly-sized channel in a suitable location may be expected to reawaken the old and establish new industries, and to develop the country's resources to many times their present proportions.

SIZE OF LOCKS.

The locks now under contract and those being planned are to be 328 feet long, 45 feet wide, with a depth of 12 feet of water over the mitre-sills. The original Barge canal law (chapter 147, Laws of 1903) fixed the size at 328 feet by 28 feet, with a mini-



BARGE CANAL, CONTRACT No. 5.
View showing detail of cutters on hydraulic dredge.

imum depth of 11 feet. This law was amended in 1905 (chapter 740) by declaring the minimum dimensions to be 328 feet, 28 feet and 12 feet, thus imposing upon the Canal Board the task of determining the limit of size. Before the passage of this amendment contracts had been let for constructing certain locks of the original dimensions. After very carefully investigating and considering all conditions, the State Engineer and the Advisory Board of Consulting Engineers recommended that the locks should be 328 feet long, 45 feet wide and should have 14 feet of water on the mitre-sills. As stated in my last annual report, the majority of the Canal Board would not sanction a depth of water of more than 12 feet, and accordingly plans of that size have been prepared and adopted.

MOVABLE DAMS.

Modern practice in canalizing rivers prescribes the use of some form of movable dam. In my last annual report I also told of the investigations made by representatives of this department of some of the large navigation projects in this country and Europe to aid in developing a plan to be adopted for the Barge canal. A bridge type of dam has been selected for use on the lower Mohawk river.

ORGANIZATION AND METHODS OF ENGINEERING WORK.

All surveying, designing and supervising of construction is done by the Barge canal department of the State Engineer's office. The entire force of engineers, draftsmen, clerical employes and laborers varies from 200 to 400 men at different seasons of the year. Every employee in the Department is selected in accordance with the State civil service laws. As provided by law, a Special Deputy State Engineer has charge, under the State Engineer, of all of the work of the Barge canal improvement.

Before the force was organized a book of instructions for preliminary work and construction work was prepared, which was submitted to the Advisory Board of Consulting Engineers and approved by that body. This book of instructions was published in the last annual report of the State Engineer.

The territory of the state is divided into three divisions, as

follows: the Eastern Division, comprising all of the state east of the east line of Oneida county; the Middle Division, from the east line of Oneida county to the west line of the town of Savannah, Wayne county; the Western Division, all of the state west of the west line of the town of Savannah, Wayne county. The work on the various divisions is under the supervision of the Division Engineer of that division. Each division, and the separate canals on each division, are divided into residencies. The work on each residency is under a Resident Engineer. On each residency there is a sufficient number of Assistant Engineers, Levelers, Draftsmen, Rodmen, Chainmen and Laborers employed to carry on the work on the residency.

All field work is performed by the men on the several residencies. After the survey maps have been made at the various residencies, that force also prepares general maps for the contract plans and certain portions of the contract drawings. The information relating to structures is transmitted to the office of the Special Deputy State Engineer, at Albany, and the plans for structures and special portions of the general plans for contracts are prepared in that office. The work in this central office is divided into various Bureaus—known as the Bridge, General Drafting, River, Lock and Computing and Checking Bureaus, each Bureau being in charge of an Expert, under whose supervision the plans, estimates and specifications are prepared for the structures on the proposed work.

After plans for any contract are completed and approved by the Special Deputy State Engineer, they are sent to the State Engineer for his approval, then to the Advisory Board of Consulting Engineers for action and then to the Canal Board for final approval. Thereafter the Superintendent of Public Works calls for bids from contractors for doing the work. If satisfactory bids are obtained, a contract is made by the Superintendent of Public Works with the lowest bidder, who proceeds to construct the work under the terms of the contract. By the provisions of the Barge canal law the actual work of construction is under the direction of the State Engineer, subject to the final joint acceptance and approval of the State Engineer and the Superintendent of Public Works.



BARGE CANAL, CONTRACT NO. 5.
View of interior of controlling room on hydraulic dredge.

In addition to the engineering organization already described, one of the best-equipped physical and chemical cement laboratories in the state has been located in the basement of the State Hall, at Albany, N. Y., in which samples of all of the cement for use in the work will be tested by experts before the cement is permitted to be used.

A photographic and blue-printing bureau has also been organized and located on the top floor of the State Hall. This bureau is equipped with electric blue-printing apparatus as well as with apparatus for sun-printing. Photographs of all buildings condemned for Barge canal purposes are made and filed for future reference, when the cases come before the State Court of Claims or the Board of Appraisers for settlement. Photographs are also taken of the construction work at the end of each month, just before the monthly estimates are made.

A bureau has been established for the collection and tabulation of all available rainfall and stream-flow data within the territory in which the Barge canal and its water-supply is located. A large number of gages on all of the streams affecting the Barge canal or its water-supply were established and arrangements were made for their daily readings.

Systems have been developed for the filing and indexing of all letters, reports, records, tracings, computations; books, photographs and other papers required for the Barge canal work.

As far as possible standard types of design for all structures on the Barge canal have been made and these are used wherever they are applicable.

CLASSIFICATION OF MATERIAL.

For the first time in the history of New York State canal work contracts have been let which provide but one price for all kinds of excavation — a condition which the Barge canal contracts secure by providing only one lump sum for each cubic yard of material excavated of every name and nature, no attempt being made to classify the different materials excavated, as earth, rock, hardpan, etc. The results have been very satisfactory in every way. Contracts were awarded at prices as low as probably would have been obtained under the old method of different prices for earth and

rock excavation, and in the actual execution of the contracts there has been no occasion for the frequent disputes and differences of opinion so common under the old method, as to just what material should be classified as earth or as rock.

To enable contractors, before bidding, to ascertain the quantities of different classes of material which the plans required to be excavated, it was thought advisable to make an exhibit to the contractors of a very complete set of borings over the area of each contract. For this purpose a large number of wash drills were constructed and crews organized for their operation, each under a competent foreman with two or more assistants. Samples of the borings were taken at regular intervals and preserved in glass bottles properly labeled. These wash drills were used for drilling through the earth until rock was reached.

On all structures where rock excavation was required, the character and nature of the rock was determined by borings made in the rock by shot drills and the cores of the rock were carefully preserved and exhibited to all bidders for each contract. About 214,000 linear feet of borings in earth have been made and about 2,800 linear feet of rock borings have also been made. The records of the drilling parties were kept in regular daily report sheets and filed in the Resident Engineers' offices.

PROGRESS OF WORK.

Topographic surveys, borings and soundings necessary for the preparation of contract drawings have been made on the line of the Barge canal from the Hudson river at Waterford to the Montezuma marshes at Fox Ridge; from Pittsford, ten miles east of Rochester, to Tonawanda; on the Oswego river from Three River Point to Lake Ontario and on the Champlain canal from Northumberland to Whitehall.

Topographic surveys, showing location of roads, streams, buildings and contour of the ground necessary for preliminary study of the canal line, have been made on the remainder of the territory traversed by the different canals. Surveys have been made for a large reservoir at Delta on the Mohawk river above Rome; at Hinckley on the West Canada creek, and at High Dam on Limestone creek, near Fayetteville; also for a conduit for carrying the



BARGE CANAL, CONTRACT NO. 5.
View showing pontoons and discharge pipe from hydraulic dredge.

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water from the reservoir at Hinckley to the main line of the Barge canal near Oriskany. The extent in miles of the surveys made is as follows:

Topography taken.....	130.25 square miles.
Transit line run.....	1,033.36 linear miles.
Levels run.....	1,427.57 linear miles.

Contracts have been let for about \$20,000,000 worth of work distributed as follows:

On the Erie canal from Waterford on the Hudson river to Crescent; for dams between Schenectady and Little Falls; for six miles of canal at the east end of Oneida lake; for 5.7 miles of canal in the Seneca river east of Savannah; for 3.3 miles of canal in deep rock cut at the western limits of the city of Rochester; and for 12.5 miles between Pendleton on Tonawanda creek and Tonawanda on the Niagara river.

On the Champlain canal from Northumberland to Whitehall, a distance of 33.7 miles, and for dams and locks on the Oswego canal at Fulton.

As above described the surveys for the whole 440 miles of Barge canal have been nearly completed. Plans have been completed, approved by the Advisory Board and Canal Board and placed under contract for about twenty million dollars' worth of work and the contractors are making satisfactory progress on same. This work includes five locks at Waterford, intended to take the place of the 16 locks at Cohoes on the existing canal, overcoming a difference of elevation of 170 feet between the Hudson river at Waterford and the upper Mohawk at Cohoes. Each of these locks will have a lift of about 34 feet, which is the highest of any locks of this type ever constructed in this country.

A large amount of entirely new and very successful machinery has been built and is being used by the contractors having this work in charge.

A total length of about seventy miles of this work is under contract.

The estimated cost of the work actually under contract is about two million dollars less than the estimated cost for the same

portions of the canal, made at the time the one hundred and one million act was prepared, for which provision was made in that law. This work has been placed under contract, too, when the prices of labor and material were very much higher than when the one hundred and one million-dollar estimate was prepared. The work also includes 21 locks which have been widened to 45 feet instead of the 28 feet, as provided in the original estimates.

In addition to the twenty million dollars' worth of work under contract, plans for about eighteen million dollars' worth of work have been completed and are ready for submission to the Advisory Board of Consulting Engineers and the Canal Board and plans for about twelve million dollars' worth of work are far enough advanced to permit their completion within the next three months.

To summarize, plans have been prepared by this Department for about thirty-eight million dollars' worth of work, providing for a total length of about 200 miles of canal.

Three million dollars' worth of Barge canal bonds have been sold, of which amount about two million dollars have been actually expended.

Detailed accounts of the progress of Barge canal work will be found in the reports of the several Division and Resident Engineers.

RECOMMENDATIONS.

Change of Location.

In carefully considering the final location of the Barge canal at various places, it has seemed wise to recommend a certain change. I call your attention to a portion of a report to the Governor from the Advisory Board of Consulting Engineers, transmitted to the Legislature February 26, 1906, (Assembly Document No. 44, pages 6 and 7) in which appears a resolution of various canal associations of New York, approving changes in the alignment of the Barge canal through the Montezuma marshes (known as the southern line), so as to follow the Clyde river; also a resolution by the Advisory Board of Consulting Engineers, reading as follows:

"Resolved, That the route south of Crusoe Island, known as the 'South Route,' be recommended to the State Engineer for adoption."



BARGE CANAL, CONTRACT NO. 4.
Side view of Lubecker excavator.

This would be in lieu of that portion of the canal as described in chapter 147, Laws of 1903, which reads as follows: "Thence substantially paralleling the New York Central railroad and to the north of it to a junction with the present Erie canal about one and eight-tenths miles east of Clyde."

From our latest studies it is believed that it will be more practicable and more economical to construct the canal through the Mon ezuma marshes to the junction of the Clyde river, thence following the Clyde river and some of its tributaries to a point near Macedon. This matter having been referred to the Attorney-General, he has expressed it as his belief that it would require some action of the Legislature to authorize this change, inasmuch as the language of chapter 147 is very specific in this particular.

I also call your attention to the statements contained in this same report of the Advisory Board concerning the probable saving to the State in case it is finally decided to construct this "south line."

I would recommend that the necessary legislation be enacted to permit this change to be made.

Bridges Crossing Navigable Streams.

In constructing the Barge canal, the canalization of streams which have been heretofore or are now navigable, renders it necessary to reconstruct the twenty-six railroad bridges and the seven toll bridges, built by private corporations. It is no more than just that the cost of this reconstruction should be borne by the private corporations owning the bridges, wherever the following conditions exist: first, where the navigable stream was a public highway prior to the time when these bridges were first constructed; second, where the title to the beds of the Hudson and Mohawk rivers, and perhaps other streams, under the old Dutch law, is vested in the State, and where the piers and abutments of these bridges have been built upon State land, without proper authority and consent of the State authorities. I recommend that action be taken to authorize the collection of these expenditures from the bridge companies.

Water-Power Development.

In the canalization of the rivers and streams for the Barge canal there will necessarily have to be constructed a large number of dams. At these dams more or less water-power can be developed by the use of surplus water while the canal is in operation, and by the use of all the water when the canal is closed. In the past the State has constructed works which have resulted in creating many millions of dollars' worth of water-power, but in nearly every instance some private individual or corporation has acquired these water-powers and made use of them without any adequate return to the State. I recommend that some arrangement be made so that, in the future, the State may be permitted to dispose of the water-power, thus created, at the market value of the power.

CONCLUSION.

The work of this Department has been under my direction throughout the entire fiscal year. Mr. Edmund F. Van Hoesen has acted as Deputy State Engineer, having a general supervision of all work except that of the Barge canal, and Mr. Henry C. Allen, as Special Deputy State Engineer, having direct charge of the Barge canal improvement.

I desire to express my appreciation of the uniform courtesy and willing assistance from all with whom I have been associated in the performance of my duties. I also take pleasure in acknowledging the ability and faithfulness of the many under my direction in carrying on the work of the Department.

Respectfully submitted,

HENRY A. VAN ALSTYNE,

State Engineer and Surveyor.

**Engineering Expenses for the Fiscal Year Ending
September 30, 1906.**

**Table of Contracts Completed During the Fiscal Year
Ending September 30, 1906.**

Table of Contracts Pending September 30, 1906.

**Table of all Contracts Awarded for Highway Improve-
ment under Chapter 115, Laws of 1898, and Amend-
ments Thereto.**

Engineering Expenses for Fiscal Year Ending September 30, 1906.

Ordinary Repairs.

WORK.	ACT.		Division.	Amount.	Total.
	Chap.	Year.			
Erie canal.....	699	1905	Eastern...	\$8,005 05	\$12,000 00
Champlain canal.....	699	1905	Eastern...	3,994 95	
Erie canal.....	699	1905	Middle...	\$6,498 66	9,000 00
Oswego canal.....	699	1905	Middle...	425 40	
Cayuga and Seneca canal.....	699	1905	Middle...	659 72	
Black River canal.....	699	1905	Middle...	1,416 22	
Erie canal.....	699	1905	Western...	\$9,000 00	9,000 00
					9,000 00
Total.....					\$30,000 00

Special Works.

WORK.	ACT.		Division.	Amount.	Total.
	Chap.	Year.			
Bridge, North Salina street, Syracuse.....	688	1906	Middle...	\$112 22	44 70
Bridge, Cold Spring.....	581 172	1903 1905	Middle...		
Dam, Brasher Falls—St. Regis river.....	230 686	1906 1906	Middle...	226 64	\$383 56
Total.....					

Special Surveys.

WORK.	ACT.		Division.	Amount.	Total.
	Chap.	Year.			
St. Lawrence county line.....	730	1904	Eastern...	\$124 45	\$7,516 01
Court of Claims survey.....	700	1905	Eastern...	1,047 20	
Topographic survey.....	686	1906	Eastern...	6,344 36	
Court of Claims survey.....	700	1905	Middle...	\$2,004 10	4,932 69
Survey, Seneca river to Cayuga lake.....	700	1905	Middle...	2,928 59	
Court of Claims survey.....	700	1905	Western...	\$2,223 17	2,223 17
Total.....					\$14,671 87

Improvement of Public Highways.

WORK.	ACT.		Division.	Amount.	Total.
	Chap.	Year.			
Highway improvement.....	115	1898	Eastern...	\$128,448 73	
	115	1898			
Maintenance and repair.....	468	1906	Eastern...	20,591 58	
	686	1906			
					\$149,040 31
Highway improvement.....	115	1898	Middle....	\$47,560 67	
	115	1898			
Maintenance and repair.....	468	1906	Middle....	7,688 31	
	686	1906			
					55,248 98
Highway improvement.....	115	1898	Western...	\$34,922 62	
	115	1898			
Maintenance and repair.....	468	1906	Western...	4,570 26	
	686	1906			
					39,492 88
Total.....					\$243,782 17
"Money system" repair of high-ways.....	700	1905	Eastern...	\$13,724 77	
	686	1906			
Total.....					\$13,724 77

Barge Canal.

WORK.	ACT.		Division.	Amount.	Total.
	Chap.	Year.			
Barge canal, head office account	147	1903	Eastern...	\$161,864 97	
	143	1905			
Erie.....	147	1903	Eastern...	84,143 66	
	143	1905			
Champlain.....	147	1903	Eastern...	32,864 97	
	143	1905			
					\$278,864 60
Barge canal, Erie.....	147	1903	Middle....	\$74,509 45	
	143	1905			
Oswego.....	147	1903	Middle....	16,619 11	
	143	1905			
					91,128 56
Barge canal, Erie.....	147	1903	Western...	\$63,870 36	
	143	1905			
					63,870 36
Total.....					\$433,863 52

Bureau of Bridge Design and Inspection.

NAME.	Rank.	Rate of compensation.	Salary.	Travel.	Total.
W. R. Davis.....	Chief bridge designer.....	\$3,300 per year	\$649 52	\$109 96	\$759 48
J. C. Peck.....	Assistant chief bridge designer.....	2,500 per year	181 25	80 70	161 95
O. H. Stratton.....	Bridge designer.....	150 per month	116 39	7 42	123 81
H. J. Schaeuermann.....	Bridge designer.....	150 per month	96 84	42 73	139 57
L. Holmes.....	Bridge designer.....	150 per month	148 62	.....	148 62
T. C. Brooks.....	Bridge designer.....	125 per month	69 52	9 42	78 94
S. R. Krawitson.....	Bridge designer.....	125 per month	24 19	.....	24 19
F. E. Krawitson.....	Mechanical engineer and draftsman.....	150 per month	92 67	16 80	109 47
F. C. Blake.....	Bridge draftsman.....	125 per month	12 10	.....	12 10
H. C. Olcott.....	Bridge draftsman.....	115 per month	98 98	.....	98 98
H. N. Peck.....	.....	.....	30 00	.....	30 00
E. E. Briggs.....	Jr. bridge draftsman.....	75 per month	.....	.....	.....
Paid for drafting instruments, drawing and blue-print paper, tracing cloth, etc.....					\$1,657 41
Total.....					\$1,757 26

Summary of Engineering Expenses for Fiscal Year Ending Sept. 30, 1906.

DIVISION.	Ordinary repairs of canals.	Special works.	Special surveys.	Highway improvement.	Money system.	Barge canal.	Bridge designs.	Total.
Eastern.....	\$12,000 00	.....	\$7,516 01	\$149,040 31	\$13,724 77	\$278,864 60	.....	\$461,145 69
Middle.....	9,000 00	\$383 56	4,932 69	55,248 98	.....	91,128 56	.....	160,693 79
Western.....	9,000 00	.....	2,223 17	38,492 88	.....	63,870 36	.....	114,586 41
							\$1,757 26	1,757 26
Total.....	\$30,000 00	\$383 56	\$14,671 87	\$243,782 17	\$13,724 77	\$433,863 52	\$1,757 26	\$738,183 15

TABLE OF CONTRACTS COMPLETED DURING THE FISCAL YEAR ENDING SEPTEMBER 30, 1906.

CONTRACTOR.	Date of contract.	Character of work.	Division.	LEGISLATIVE ACT.		Contract price.	Final payments.
				Chap.	Year.		
Walter Bradley and Co.	June 3, 1902	Raising and completing High Dam, Oswego river.	Middle. . . .	845 894 892 894	1901 1902 1902 1902	\$4,277 75	\$4,414 85
Wm. H. Welch.	Sept. 13, 1904	Continuing improvement of harbor, Canandaigua lake. .	Middle. . . .	729 720 720	1904 1904 1904	3,598 50	3,546 48
The King Bridge Co. . .	Jan. 11, 1905	Cold Spring bridge, Seneca river (Oswego canal).	Middle. . . .	581 172	1903 1903	18,431 50	18,725 25
Rochester Bridge and Construction Co.	May 3, 1905	Superstructure of Willow street bridge, Oswego canal, Syracuse.	Middle. . . .	600 172	1903 1905	13,259 20	13,413 85
John Young.	Jan. 18, 1906	Making alterations to Welch-lock building at Syracuse. .	Middle. . . .	700	1905	4,144 70	4,482 70

TABLE OF CONTRACTS COMPLETED DURING THE YEAR. 45

Improvement of Public Highways.

Chapter 115, Laws of 1898.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Contract price.	Final payments.
John H. Kahrs.....	Oct. 5, 1905	Pines Bridge-Yorktown Heights road, No. 148-A, Westchester county.	Eastern.	\$635 00	\$635 00
Board of Supervisors of Orange county	June 24, 1903	Newburgh-Campbell Hall road, No. 153, Orange county.	Eastern.	64 450 00	86 816 67
Board of Supervisors of Orange county	June 24, 1903	Chester-Val's Gate road, No. 154, Orange county.	Eastern.	50 425 00	51 837 20
Robert Shafer.....	July 26, 1904	Albany-Schenectady road, No. 176, Albany county.	Eastern.	20 612 83	21 447 00
Albany Material and Construction Co.	June 9, 1904	Schoharie (sections 1 and 2) road, No. 177, Albany county.	Eastern.	38 749 00	42 721 55
Jeremiah T. Finch.....	June 8, 1904	Delaware turnpike (section 3) road, No. 178, Albany county.	Eastern.	74 985 00	85 886 28
Buckley Construction Co.....	June 17, 1904	Schenectady-Albany road, No. 179, Schenectady county.	Eastern.	25 690 00	28 510 67
Joseph Walker.....	June 9, 1904	Beaver Dam road, No. 192, Albany county.	Eastern.	28 700 00	35 867 04
Jeremiah T. Finch.....	June 11, 1904	River road, No. 193, Albany county.	Eastern.	67 903 00	69 055 56
Joseph Walker.....	May 29, 1906	East Nassau road, No. 196, Rensselaer county.	Eastern.	4 800 00	5 898 60
Thomas H. Karr.....	June 23, 1904	Delaware turnpike (section 4) road, No. 198, Albany county.	Eastern.	14 670 00	14 252 30
Michael F. Dollard.....	June 9, 1904	Delaware turnpike (section 5) road, No. 199, Albany county.	Eastern.	59 742 00	66 967 87
Joseph Walker.....	June 9, 1904	Delaware turnpike (section 5) road, No. 199, Albany county.	Eastern.	49 980 00	61 070 47
The Scofield Co.....	June 23, 1904	Boston-Albany road, No. 202, Rensselaer county.	Eastern.	45 980 00	51 264 27
Town of East Greenbush.....	April 30, 1906	Boston and Albany road, No. 202-A, Rensselaer county.	Eastern.	45 555 00	600 00
James E. Martin.....	July 26, 1904	South road, No. 223, Dutchess county.	Eastern.	39 903 00	44 301 79
County of Broome.....	June 16, 1904	Chenango Tow-path road, No. 175, Broome county.	Middle.	9 988 50	12 267 20
Elisha W. Visser.....	July 14, 1904	Bedwood-Alexandria Bay (section 1) road, No. 182, Jefferson county.	Middle.	23 490 00	27 876 00
Casey and Murray.....	July 13, 1904	Greene-Smithville Flats road, No. 218, Chenango county.	Middle.	33 605 00	35 106 07
Henry P. Burgard.....	June 7, 1904	Penfield (section 2) road, No. 167, Monroe county.	Western.	30 500 00	30 686 45
Frederick A. Botsch.....	Oct. 15, 1904	Portland Avenue (section 1) road, No. 172, Monroe county.	Western.	6 080 00	6 585 97
Mott and Kemper.....	June 10, 1904	East Side Lake (section 1) road, No. 190, Ontario county.	Western.	16 980 00	18 889 24
Moser and Summers.....	June 17, 1904	Honesoye-Hemlock road, No. 191, Ontario county.	Western.	34 900 00	35 377 42
Moser and Summers.....	July 17, 1906	Honesoye-Hemlock road, No. 191-A, Ontario county.	Western.	1 062 82	1 062 82
Henry P. Burgard.....	July 14, 1904	Geneva-Canandaigua (section 2) road, No. 207, Ontario county.	Western.	45 000 00	49 387 02

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906.

CONTRACTOR.	Date of contract.	Character of work.	Division.	LEGISLATIVE A.C.T.		Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906.
				Chap.	Year.			
B. P. Clark.....	Aug. 22, 1906	Constructing a new apron and repairing State Dam at Brashers Falls.....	Middle.....	729 700 230 686	1904 1905 1906 1906	\$5,038 25	\$5,038 25	\$2,007 00

<i>Construction of Barge Canal.</i>								
Chapter 147, Laws of 1903.								
CONTRACTOR.	Date of contract.	Character of work.	Division.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906.		
Empire Engineering Co.....	April 18, 1905	Contract No. 1, Champlain canal.....	Eastern..	\$712,823 00	\$605,008 40	\$30,420 00		
Ferguson Contracting Co.....	April 3, 1905	Contract No. 2, Erie canal.....	Eastern..	1,176,036 00	852,330 00	145,710 00		
John W. Flynn.....	May 15, 1905	Contract No. 2-A, Erie canal.....	Eastern..	4,810 00	7,550 00	.....	
John W. Flynn.....	May 15, 1905	Contract No. 2-B, Erie canal.....	Eastern..	1,290 00	1,005 00	.....	
Sundstrom and Stratton.....	April 4, 1905	Contract No. 3, Champlain canal.....	Eastern..	874,662 00	670,497 00	197,694 00		
Sundstrom and Stratton.....	Oct. 3, 1905	Contract No. 3-A, Champlain canal.....	Eastern..	4,255 00	1,615 00	.....	
Groton Bridge Co.....	Aug. 10, 1906	Contract No. 7, Erie and Champlain canals.....	(Eastern.. / Middle.. / Western..)	117,441 10	97,635 20	.....	
Pittsburg Eastern Co.....	May 22, 1906	Contract No. 8, Erie canal.....	Eastern..	1,746,140 00	1,433,817 00	.....	
Fort Orange Construction Co.....	May 21, 1906	Contract No. 11, Erie canal.....	Eastern..	1,922,092 75	1,359,475 00	1,440 00		
Atlantic, Gulf and Pacific Co.....	Aug. 9, 1906	Contract No. 15, Champlain canal.....	Eastern..	1,587,874 00	1,516,960 00	.....	
M. Fitzgerald.....	Aug. 8, 1906	Contract No. 34, Erie canal.....	Eastern..	22,604 00	20,611 50	.....	
Empire Engineering Corp'n.....	April 18, 1905	Contract No. 4, Erie canal.....	Middle..	812,560 00	726,815 00	37,062 00		
Empire Engineering Corp'n.....	April 18, 1905	Contract No. 5, Erie canal.....	Middle..	421,252 50	381,987 50	10,251 00		
Mosier and Summers, Inc.....	June 7, 1906	Contract No. 10, Oswego canal.....	Middle..	1,149,988 00	1,126,718 00	1,998 00		
F. A. Maselli and Co.....	May 8, 1905	Contract No. 6, Erie canal.....	Western..	1,588,912 00	1,005,982 50	231,327 00		

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906. 47

Improvement of Public Highways.
Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906.
Gauging and Hydr...	June 19, 1903	Turk Hill-Putnamco line road No. 151, Watchtower county...	Eastern.	\$70,650 00	\$51,200 00	\$43,032 75
Orange County Road Construction Co.	July 20, 1906	Woodbury-Central Valley road No. 157, Orange county...	Eastern.	24,330 00	18,367 80	6,307 93
Alonso Schupp...	Sept. 1, 1906	Norfolk-Central Valley road No. 158, Montgomery county...	Eastern.	7,665 00	6,590 00	...
Orange County Road Construction Co.	June 18, 1904	State Hill-Ugawville road No. 160, Orange county...	Eastern.	52,000 00	45,200 00	30,734 77
Orange County Road Construction Co.	June 18, 1904	Neenah-Schwanauk road No. 161, Orange county...	Eastern.	54,129 00	48,250 00	30,708 95
Thomas H. Karr.	June 23, 1904	Wynantkill-Wat Sand Lake road No. 163, Rensselaer county...	Eastern.	39,400 00	33,400 00	21,657 00
William H. Materson.	June 13, 1904	Troy-Potomac road No. 201, Rensselaer county...	Eastern.	33,450 00	28,694 12	19,694 27
Carlisle Construction Co.	July 9, 1906	Braunsville-Curpik road No. 221, Rensselaer county...	Eastern.	30,700 00	25,900 00	4,428 90
John E. Connelley.	June 29, 1906	Saugerties-Kingston road No. 228, Ulster county...	Eastern.	55,700 00	40,800 00	8,191 80
Joseph Walker.	July 11, 1906	Kingston-Kingston road No. 231, Ulster county...	Eastern.	88,200 00	63,439 00	...
McNamee and Rice.	July 7, 1906	Old State road No. 232, Ulster county...	Eastern.	71,100 00	63,250 00	3,030 75
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Old State road No. 232, Ulster county...	Eastern.	21,700 00	18,000 00	7,200 00
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Old State road No. 232, Ulster county...	Eastern.	14,300 00	12,700 00	1,267 30
Morris Kantrowitz.	Aug. 30, 1906	Dalhousie-Schuyler road No. 233, Herkimer county...	Eastern.	53,300 00	46,775 00	...
John W. Flynn.	July 13, 1906	Chloro-Wadsworth road No. 240, Saratoga county...	Eastern.	24,432 41	21,138 40	10,653 75
Schenectady Contracting Co.	July 13, 1906	Saratoga-Bullhead road No. 241, Saratoga county...	Eastern.	40,340 00	30,669 00	...
Saratoga Trap Rock Company.	July 13, 1906	Saratoga-Bullhead road No. 241, Saratoga county...	Eastern.	9,520 00	8,513 40	...
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Mechanicville-Saratoga road No. 243, Saratoga county...	Eastern.	21,300 00	18,000 00	324 00
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Mechanicville-Saratoga road No. 243, Saratoga county...	Eastern.	59,550 00	55,000 00	3,094 00
Robert Shafer.	July 12, 1906	Glensville-Saratoga road No. 246, Fulton county...	Eastern.	21,000 00	17,203 07	928 98
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Johnstown-Keek's Center (section 2) road No. 247, Fulton county...	Eastern.	47,100 00	40,000 00	...
Schenectady Contracting Co.	Sept. 1, 1906	Glensville-Saratoga road No. 248, Fulton county...	Eastern.	22,300 00	16,243 00	...
The Buckley Construction Co.	July 6, 1906	Old Plank road No. 249, Fulton county...	Eastern.	28,000 00	24,900 00	5,356 80
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Plattsburgh-Kewau (section 3) road No. 258, Clinton county...	Eastern.	56,700 00	36,000 00	...
The Buckley Construction Co.	July 6, 1906	Plattsburgh-Kewau (section 3) road No. 258, Clinton county...	Eastern.	75,170 00	55,894 00	5,030 46
The Buckley Construction Co.	Aug. 1, 1906	Plattsburgh-Kewau (section 3) road No. 258, Clinton county...	Eastern.	43,660 00	33,000 00	207 00
The Boield Co.	July 6, 1906	Peekskill-Salem Center (section 1) road No. 261, Westchester county...	Eastern.	50,150 00	43,233 00	...
The Boield Co.	July 6, 1906	Peekskill-Salem Center (section 2) road No. 262, Westchester county...	Eastern.	41,250 00	33,711 00	3,944 19
Andrews Bros.	July 10, 1906	Birch Hill road No. 270, Nassau county...	Eastern.	14,950 00	10,172 69	4,234 02
Robert Shafer.	July 12, 1906	Lake Placid-Saratoga road No. 271, Hamilton county...	Eastern.	33,900 00	24,443 40	439 98
Degrass and Hogeboom.	Aug. 30, 1906	Greenville-Saratoga road No. 292, Orange county...	Eastern.	65,900 00	56,865 00	...
Orange County Road Construction Co.	Sept. 4, 1906	Greenville-Saratoga road No. 292, Orange county...	Eastern.	72,000 00	57,350 00	...
Martin Murray.	July 2, 1906	Avon Park-Crooked Lake road No. 284, Rensselaer county...	Eastern.	34,400 00	27,660 00	1,463 64
Thomas H. Karr.	July 7, 1906	Nassau-Braintree road No. 285, Rensselaer county...	Eastern.	34,900 00	31,500 00	3,402 00
Morris Kantrowitz.	Aug. 30, 1906	Rensselaer-Braintree road No. 285, Rensselaer county...	Eastern.	43,700 00	35,349 00	...
John H. Gordon.	July 3, 1906	Troy-Sand Lake (section 2) road No. 288, Rensselaer county...	Eastern.	20,800 00	14,500 00	5,111 10

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906 — (Continued).
Improvement of Public Highways — (Continued).

CONTRACTOR.	Date of contract.	Character of work.	Division.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906.
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Amsterdam-Hagaman road, No. 238, Montgomery county.	Eastern.	\$19,400 00	\$15,000 00	.....
Joseph Walker.	July 11, 1906	Saulwater's Corners-Young's Corners road, No. 289, Montgomery county.	Eastern.	29,100 00	27,000 00	.....
Joseph Walker.	July 11, 1906	De Graff's Corners-Sherburne's Corners road, No. 300, Montgomery county.	Eastern.	10,200 00	9,800 00	13,438 80
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Milwaukee-South Bush road, No. 301, Montgomery county.	Eastern.	20,500 00	15,000 00	2,025 00
D. S. Snell and Co.	July 9, 1906	Fonda-Berenville road, No. 302, Montgomery county.	Eastern.	16,300 00	14,320 00	2,577 60
Town of Rochester.	July 3, 1906	Kington-Ellersville section 2 road, No. 305, Clark county.	Eastern.	71,725 00	56,500 00	508 50
Orange County Road Construction Co.	Sept. 4, 1906	Middletown-Cuddesbackville section D road, No. 312, Orange county.	Eastern.	42,100 00	38,400 00	.....
S. B. Van Wageningen.	June 30, 1906	Gilbertsville-Mt. Upton road, No. 314, Orange county.	Eastern.	46,900 00	37,000 00	.....
The Clinton Beckwith Engineering and Contracting Co.	July 9, 1906	Col. J. Albertville section D road, No. 315, Orange county.	Eastern.	32,700 00	26,000 00	1,872 00
Silver and Gould.	July 10, 1906	Col. J. Albertville-Enmons road, No. 316, Orange county.	Eastern.	13,100 00	10,716 00	4,050 65
Silver and Gould.	July 10, 1906	Shady Side-Orango road, No. 317, Orange county.	Eastern.	26,270 00	19,967 75	.....
S. B. Van Wageningen.	June 30, 1906	Gilbertsville-Milford Center road, No. 318, Orange county.	Eastern.	20,700 00	16,500 00	2,673 00
S. B. Van Wageningen.	June 30, 1906	Schroonville-Maryland road, No. 319, Orange county.	Eastern.	41,300 00	34,400 00	12,023 23
Orange County Road Construction Co.	July 20, 1906	Peckskill-Salem Center (section 3) road, No. 331, Washington county.	Eastern.	47,900 00	42,000 00	.....
Orange County Road Construction Co.	July 20, 1906	Peckskill-Salem Center (section 4) road, No. 332, Washington county.	Eastern.	39,650 00	34,680 00	.....
Buckley Construction Co.	July 6, 1906	Saratoga-Corinth road, No. 340, Saratoga county.	Eastern.	13,500 00	51,000 00	.....
John W. Polanco.	July 6, 1906	Stockport-Hudson road, No. 341, Columbia county.	Eastern.	30,150 00	23,100 00	4,781 70
John W. Polanco.	Aug. 28, 1906	Churcham-Chatham Center road, No. 342, Columbia county.	Eastern.	8,700 00	7,500 00	.....
The General Construction Co.	July 7, 1906	Powling-Patterson road, No. 343, Dutchess county.	Eastern.	24,350 00	21,915 00	1,183 41
The Jane Construction Corporation.	July 9, 1906	Millicent-North East Center road, No. 344, Dutchess county.	Eastern.	19,950 00	16,000 00	3,312 00
Charles R. Lewis.	July 10, 1906	Frankfort-Utica (section 2) road, No. 350, Herkimer county.	Eastern.	18,700 00	14,000 00	1,182 60
Alonso Schupp.	July 2, 1906	Poland-Cold Brook road, No. 350, Herkimer county.	Eastern.	3,740 00	3,700 00	3,373 72
Ulysses G. Stockwell.	July 9, 1906	Johnstown-Tribes Hill section D road, No. 361, Fulton county.	Eastern.	4,150 00	20,149 00	7,072 30
Robert Shadr.	July 12, 1906	Preston Hollow-Potter Hollow road, No. 364, Albany county.	Eastern.	27,400 00	24,036 50	1,780 03
James H. McFadden.	July 11, 1906	Gildersleeve Center-Giv derland road, No. 365, Albany county.	Eastern.	17,990 00	14,088 14	3,803 80
Joseph Walker.	July 11, 1906	New Scotland-Wolf Hill road, No. 367, Albany county.	Eastern.	88,900 00	58,500 00	20,333 50
The Buckley Construction Co.	July 6, 1906	Glenmont-Feura Bush road, No. 367, Albany county.	Eastern.	12,750 00	48,460 00	14,660 51
Cas y and Murray.	July 10, 1906	Lake George-Bolton Landing road, No. 417, Warren county.	Eastern.	84,700 00	72,500 00	18,270 00
Cas y and Murray.	July 10, 1906	Lake George-Bolton Landing road, No. 418, Warren county.	Eastern.	108,875 00	82,500 00	.....
Lawlor and Hains.	Aug. 31, 1906	Rhinebeck-Hyde Park road, No. 422, Dutchess county.	Eastern.	37,725 00	31,998 00	.....
The Buckley Construction Co.	Sept. 1, 1906	Chazy-Chazy Landing-Ober's Corners road, No. 433, Clinton county.	Eastern.	38,425 00	33,987 00	.....
Andrews Bros.	July 10, 1906	Arundale-Bay View road, No. 434, Nassau county.	Eastern.	13,800 00	11,123 26	394 56
Peace Bros.	Sept. 1, 1906	South Glenwood-Meeting House road, No. 435, Nassau county.	Eastern.	21,000 00	17,500 00	630 00
Jeremiah T. Finch.	Sept. 1, 1906	Jericho Turnpike-Plainview road, No. 436, Nassau county.	Eastern.	80,950 00	56,000 00	.....

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906. 49

The Clinton Beckwith Engineering and Contracting Co.		Aug. 31, 1906	Saratoga-Glens Falls section 4 and 5) road, No. 441, Saratoga county.		Eastern.	74,700 00	59,987 00	.....
McNance and Rice	.....	July 10, 1906	Poughkeepsie-Hyde Park road, No. 453, Dutchess county	.....	Eastern.	52,450 00	38,000 00	.....
Ulysse A. G. S. S. S. S.	.....	July 19, 1906	Little Falls-Herkimer road, No. 457, Herkimer county	.....	Eastern.	61,500 00	48,940 00	881 08
Sylvia H. S. S. S.	.....	July 9, 1906	Herkimer-Herkimer road, No. 288, Herkimer county	.....	Eastern.	65,500 00	55,960 00	3,524 95
John H. Nelson & Co.	.....	July 10, 1906	East Schuylkill-Deerfield road, No. 460, Herkimer county	.....	Eastern.	38,525 00	31,367 00	1,906 02
The Clinton Beckwith Engineering and Contracting Co.	.....	July 10, 1906	Herkimer-Middlefield road, No. 460, Herkimer county	.....	Eastern.	12,300 00	56,000 00	2,520 00
John H. Nelson & Co.	.....	July 10, 1906	Amesbury-Porter-Clinton road, No. 476, Clinton county	.....	Eastern.	12,515 00	62,325 93	.....
The Clinton Beckwith Engineering and Contracting Co.	.....	Aug. 31, 1906	Northeast-Carter-Sharon road, No. 534, Dutchess county	.....	Eastern.	56,150 00	44,640 00	.....
The Lane Construction Co.	.....	July 9, 1906	Amesbury-Wasserkil road, No. 437, Dutchess county	.....	Eastern.	37,100 00	31,600 00	.....
General Construction Co.	.....	July 7, 1906	Chatham-Spencer road, No. 540, Columbia county	.....	Eastern.	45,500 00	30,900 00	.....
John W. P. S. S.	.....	July 6, 1906	Poughkeepsie-Poughkeepsie road, No. 549, Dutchess county	.....	Eastern.	23,500 00	19,200 00	1,352 40
John E. M. V. S.	.....	July 5, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	18,400 00	52,496 00	1,889 86
Herman and Sprad.	.....	Aug. 28, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	18,400 00	14,960 00	.....
McNance and Rice	.....	July 10, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	25,700 00	22,000 00	.....
Joseph W. S. S.	.....	July 11, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	25,700 00	22,000 00	.....
Fremont T. S. S.	.....	July 9, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	58,200 00	48,287 00	3,960 00
Harry S. Williams	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	28,100 00	24,987 00	19,883 23
County of Rockland.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Eastern.	105,650 00	105,586 00	.....
County of Broome.	.....	June 18, 1904	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	22,500 00	19,900 00	17,551 90
County of Broome.	.....	June 18, 1904	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	9,350 00	4,740 00	2,051 57
County of Broome.	.....	June 18, 1904	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	25,900 00	22,960 00	6,310 40
County of Broome.	.....	June 18, 1904	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	16,450 00	12,704 00	25,669 59
County of Broome.	.....	June 18, 1904	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	50,000 00	41,348 00	11,809 46
Douglas N. Ashby.	.....	July 12, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	49,950 00	45,176 00	31,541 15
Celis in C. Burns.	.....	July 7, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	15,180 00	13,962 00	3,518 42
Brennan and O'Brien.	.....	July 7, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	12,000 00	10,887 00	4,997 13
Celis in C. Burns.	.....	July 7, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	30,450 00	27,858 00	.....
County of Broome.	.....	July 12, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	144,100 00	133,050 00	15,566 95
County of Broome.	.....	July 12, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	30,000 00	28,474 70	4,527 17
County of Broome.	.....	July 12, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	13,750 00	13,319 00	.....
County of Broome.	.....	July 12, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	54,750 00	54,652 70	7,811 43
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	10,150 00	9,083 68	5,377 89
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	86,500 00	79,800 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	15,250 00	14,406 28	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	31,500 00	30,604 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	13,550 00	12,700 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	10,550 00	9,350 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	9,500 00	8,750 00	472 60
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	29,750 00	28,750 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	49,230 00	43,250 00	1,557 10
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	36,550 00	31,450 00	16,637 86
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	19,500 00	17,300 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	37,400 00	33,182 00	.....
County of Broome.	.....	Sept. 1, 1906	Valley Forge-East Park road, No. 550, Dutchess county	.....	Middle.	14,900 00	13,111 00	.....

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906—(Concluded).
Improvement of Public Highways—(Concluded).

CONTRACTOR.	Date of contract.	Character of work.	Division.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906.
William S. Tyler.....	Sept. 18, 1906	Georgetown road, No. 339, Madison county.....	Middle..	\$31,400 00	\$27,487 50	
Wm. J. Dwyer.....	July 9, 1906	Callanher road, No. 348, Onondaga county.....	Middle..	20,400 00	18,000 00	\$10,322 04
John H. Gordon.....	Aug. 23, 1906	Agincourt road, Onondaga Falls, No. 369, Onondaga county.....	Middle..	30,600 00	28,000 00	
The Barnett Contracting Co.....	Sept. 18, 1906	Munro road, No. 370, Oswego county.....	Middle..	6,750 00	6,170 00	
County of Broome.....	July 12, 1906	Maine road, No. 374, Broome county.....	Middle..	33,550 00	32,902 80	
County of Broome.....	July 12, 1906	Hacker road, No. 375, Broome county.....	Middle..	6,550 00	6,230 50	
Chas. H. Quereau.....	July 10, 1906	Cincinnati road, No. 377, Cortland county.....	Middle..	4,000 00		3,186 45
John Weber & Sons.....	July 10, 1906	McGraville road, No. 378, Cortland county.....	Middle..	30,750 00	28,661 00	3,359 29
John Weber & Sons.....	Sept. 19, 1906	Harford road, No. 379, Cortland county.....	Middle..	7,600 00	6,863 00	
Brayer Bros.....	July 10, 1906	Owasco road, No. 383, Cayuga county.....	Middle..	21,500 00	18,000 00	6,804 00
County of Broome.....	July 12, 1906	Vestal road, No. 423, Broome county.....	Middle..	35,600 00	35,287 18	
Wm. J. Seulpter.....	July 3, 1906	Adams-Watertown (section 2) road, No. 425, Jefferson county.....	Middle..	26,100 00	24,000 00	
Celis in C. Burns.....	July 7, 1906	Watertown-Carlhage (section 2) road, No. 427, Jefferson county.....	Middle..	42,230 00	31,256 00	10,669 12
Wm. J. Dwyer.....	July 9, 1906	Thomson road, No. 429, Onondaga county.....	Middle..	25,000 00	22,700 00	
J. Charles Dayton.....	July 23, 1906	Jordan Valley (section 1) road, No. 430, Onondaga county.....	Middle..	16,200 00	13,797 00	9,437 15
J. Charles Dayton.....	July 23, 1906	Skaneateles Spafford road, No. 431, Onondaga county.....	Middle..	27,000 00	25,997 00	
M. F. Dillard.....	Aug. 24, 1906	Augsburg road (Lowell and Spencer sections), No. 438, Onondaga county.....	Middle..	70,500 00	66,666 00	300 00
Douglas V. Ashby.....	July 10, 1906	Cortland-Groton (section 1) road, No. 446, Cortland county.....	Middle..	11,100 00	9,752 00	
Wm. J. Dwyer.....	July 9, 1906	Clevers-South Bay road, No. 452, Onondaga county.....	Middle..	33,100 00	28,937 95	
County of Tompkins.....	Aug. 30, 1906	Ithaca road, No. 454, Tompkins county.....	Middle..	37,900 00	33,238 75	299 15
County of Tompkins.....	Aug. 30, 1906	Wyckoff road, No. 455, Tompkins county.....	Middle..	4,500 00	3,851 25	
County of Tompkins.....	Aug. 30, 1906	Catskill turnpike (section 3), No. 483, Tompkins county.....	Middle..	44,400 00	35,655 25	
Wm. S. Tyler.....	July 6, 1906	Chittenango-Eagle Village road, No. 500, Madison county.....	Middle..	21,700 00	19,000 00	4,446 00
Mott and Kemper.....	July 6, 1906	Oswego-Mexico (section 1) road, No. 509, Oswego county.....	Middle..	60,000 00	44,700 00	13,215 90
John Weber & Sons.....	July 10, 1906	Homer-Tully (section 1) road, No. 510, Cortland county.....	Middle..	29,366 00	25,770 00	
Chambers and Grady.....	Sept. 18, 1906	Auburn-Elbridge road, No. 502, Cayuga county.....	Middle..	56,400 00	47,000 00	
Pittsford Construction Co.....	Aug. 14, 1906	Penfield (section 1) road, No. 106-A, Monroe county.....	Western..		148 25	
Pittsford Construction Co.....	Aug. 14, 1906	Penfield (section 2) road, No. 107-A, Monroe county.....	Western..		972 55	454 28
John Johnson.....	Sept. 19, 1906	Drury (section 1) road, No. 109-A, Monroe county.....	Western..		572 50	
John Johnson.....	Sept. 19, 1906	East Side Lake (section 1) road, No. 188-A, Ontario county.....	Western..		153 00	
John Johnson.....	Sept. 19, 1906	Reeds Corners road, No. 203-A, Ontario county.....	Western..		500 00	
Frederick A. Broeseh.....	Aug. 10, 1906	Graham-Stanley road, No. 204, Ontario county.....	Western..	21,000 00	804 80	6,395 40
Frederick A. Broeseh.....	July 5, 1906	Gravel Street road, No. 231, Niagara county.....	Western..	18,400 00	17,500 00	14,546 93
Frederick A. Broeseh.....	July 11, 1906	Clifton (section 2) road, No. 252, Monroe county.....	Western..	22,230 00	18,000 00	13,521 88
Frederick A. Broeseh.....	July 11, 1906	Loyal road, No. 253, Monroe county.....	Western..	22,000 00	18,000 00	
Frederick A. Broeseh.....	July 11, 1906	Chili (section 1) road, No. 254, Monroe county.....	Western..	21,000 00	18,400 00	
Frederick A. Broeseh.....	July 11, 1906	Chili (section 2) road, No. 255, Monroe county.....	Western..	26,000 00	16,070 00	
Greece Construction Co.....	July 13, 1906	Little Ridge (section 3) road, No. 256, Monroe county.....	Western..	28,800 00	23,600 00	

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1906. 51

CONTRACTOR.	Date of contract.	Character of work.	Division.	Contract per cc.	Payments to Sept. 30, 1906.
Frederick A. Brotsch.	July 11, 1906	Little Ridge (section 4) road, No. 257, Monroe county.	Western.	23,000 00	.....
Gantz-Wilson Construction Co.	July 18, 1906	Aurora-Buffalo (section 2) road, No. 263, Erie county.	Western.	39,950 00	.....
Erie County Board of Supervisors.	July 10, 1906	Aurora-Buffalo (section 3) road, No. 264, Erie county.	Western.	6,500 00	.....
Frederick A. Brotsch.	July 11, 1906	Hilton road, No. 269, Monroe county.	Western.	23,000 00	.....
John Johnson.	July 10, 1906	Orchard Park (section 5) road, No. 2, Erie county.	Western.	13,700 00	9,629 88
Greece Construction Co.	July 13, 1906	Barnards Crossing (sections 1 and 2) road, No. 2/6, Monroe county.	Western.	39,400 00	.....
Henry C. Schroeder.	July 10, 1906	Geneva-Canadagua (section 3) road, No. 333, Ontario county.	Western.	8,490 70	.....
Henry C. Schroeder.	July 10, 1906	Louis-Geneva road, No. 334, Ontario county.	Western.	8,242 44	5,943 11
Maiter and Summers, Inc.	July 5, 1906	Victor-Mendon (section 1) road, No. 335, Ontario county.	Western.	15,716 00	12,475 50
Boyer and Rawlins.	July 7, 1906	Erie-Horseshoe road, No. 356, Chemung county.	Western.	36,400 00	5,336 57
Casell and Neagle.	Sept. 13, 1906	Grand Central Avenue road, No. 357, Chemung county.	Western.	102,000 00	93,012 00
Gantz-Wilson Construction Co.	Sept. 13, 1906	Clinton Street (section 1) road, No. 371, Erie county.	Western.	16,400 00	16,850 16
Gantz-Wilson Construction Co.	July 18, 1906	Clinton Street (section 2) road, No. 371, Erie county.	Western.	55,900 00	1,239 97
Wm. E. Baldwin & Co.	July 18, 1906	Goodrich road, No. 3, Erie county.	Western.	61,500 00	52,965 00
Thomas Hucknell.	Aug. 31, 1906	Five Corners-Kuckville (section 1) road, No. 386, Orleans county.	Western.	89,197 00	.....
Thomas Hucknell.	Aug. 31, 1906	Five Corners-Kuckville (section 2) road, No. 386, Orleans county.	Western.	21,300 00	17,531 00
Chambers and Grady.	July 9, 1906	Kendall Corners road, No. 388, Orleans county.	Western.	41,500 00	.....
Good Roads Construction Co.	Sept. 8, 1906	Staplehurst Bridge-Lewiston road, No. 4/5, Niagara county.	Western.	24,900 00	.....
McCarthy and Simerson.	July 11, 1906	Danaville-Mt. Morris (section 3) road, No. 482, Livingston county.	Western.	25,500 00	1,399 00
Chambers and Grady.	July 9, 1906	Canadagua-Victor road, No. 484, Ontario county.	Western.	25,000 00	22,850 00
Wm. E. Baldwin & Co.	July 9, 1906	Transit (section 3) road, No. 507, Niagara county.	Western.	51,000 00	44,135 00
Fred. W. Knickenberg.	June 30, 1906	Clarence-Hunt Corners road, No. 622, Erie county.	Western.	48,000 00	13,126 81
Wm. E. Baldwin & Co.	July 9, 1906	Hamburg-North Collins road, No. 622, Erie county.	Western.	41,000 00	38,699 00
Fred. W. Knickenberg.	June 30, 1906	East Pembroke-Bataavia road, No. 686, Genesee county.	Western.	114,900 00	31,800 00
			Western.	94,000 00	13,173 30
			Western.	49,000 00	37,960 00
Joseph Walker.	July 20, 1906	Contract No. 1—Roads Nos. 11, 23 and 102, in the county of Rensselaer.	Eastern.	42,084 00	.....
The Orange County Road Construction Co.	Sept. 1, 1906	Contract No. 17—Roads Nos. 42, 43, 44, 45, 46, 64, 65, 93, 95, 113, 114, 115, 153 and 159, in the county of Orange.	Eastern.	Unit prices	.....
James Duell.	Aug. 25, 1906	Contract No. 18—Roads Nos. 52 and 53, in the county of Washington.	Eastern.	9,369 00	.....
Pittsford Construction Co.	Aug. 14, 1906	Contract No. 11—Roads Nos. 5, 60, 61 and 94, in the county of Monroe.	Western.	15,791 00	13,916 49
Grand Avenue Horse Co.	Aug. 9, 1906	Contract No. 12—Roads Nos. 168 and 170, in the county of Monroe.	Western.	10,035 00	4,479 21

Maintenance and Repairs of Improved Public Highways.
Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906.

EXPLANATORY NOTES.—"Same" means that the filler was screened from the crushed stone forming the course. Bl means bluestone, which is a tough sandstone. Li means limestone; gran means granite or granitic; quart, quartzite; san, sandstone; fld, fieldstone; gr, gravel; lo, local; qua, quarried; ro, rock; br, broken; st, stone; sam, same; sh, shale.

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavated in p r mls.	MATERIALS.				TOTAL COST COMPLETED.	
								Borrow. (Usually 4 inches thick after rolling.)	Top (Usually 2 inches thick after rolling.)	Per cent completed.	Whole.	Per mile.	
								Kind of screenings or hard rock.	Kind of screenings or hard rock.	Kind of screenings or sand as filler.			
1	Poor and Schenectady	Schenectady	9, 7, '98	2.00		Feet.	Feet.	Limestone.	Same.	Limestone.	100	\$18,517 51	\$8,259
2	White's Corners-Hamburg	Erie	10, 4, '98	6.540	12	12	22	Limestone.	Same.	Limestone.	100	20,923 60	4,729
2a	White's Corners	Erie	9, 2, '98	6.540	20	15	22	Limestone.	Same.	Limestone.	100	24,234 57	3,715
3	Deerfield	Deerfield	10, 2, '98	2.27	12	12	18	Limestone.	Same.	Limestone.	100	16,333 24	7,261
4	New Lebanon-Fitfield	Columbia	10, 25, '98	1.22	16	16	21	Gravel.	None.	None.	100	13,962 57	8,124
5	East Avenue	Monroe	9, 6, '99	2.45	12	12	22	Limestone.	Same.	Limestone.	100	13,863 70	5,673
6	Little Ridge, Sec. 1	Monroe	9, 16, '99	0.53	16	16	22	Limestone.	Same.	Limestone.	100	40,013 89	6,128
7	Delaware Turnpike, Sec. 1	Albany	9, 12, '00	1.04	15	15	22	Lo Roy li.	Lo Roy li.	Limestone.	100	23,672 80	7,578
7a	Delaware Turnpike, Sec. 1	Albany	9, 27, '03	1.04	15	15	22	Limestone.	Same.	Limestone.	100	7,881 53	
7b	Delaware Turnpike, Sec. 1	Albany	4, 7, '03	1.04	15	15	22	Limestone.	Same.	Limestone.	100	12,889 56	10,741
8	Cortland Street	Onondaga	9, 6, '99	1.23	15	15	22	Li st.	Same.	Limestone.	100	7,729 93	13,327
9	James Street	Onondaga	9, 21, '99	0.58	15	15	22	Li st.	Same.	Limestone.	100	7,437 28	7,437
10	Troy and Brunswick, Sec. 1	Rensselaer	7, 1, '99	1.00	15	22, 23	22	Limestone.	Same.	Limestone.	100	10,642 75	10,333
11	Troy and Brunswick, Sec. 1	Rensselaer	7, 21, '99	1.03	15	15	22	Limestone.	Same.	Limestone.	100	20,903 04	8,040
12	Southport, Sec. 1	Chemung	5, 16, '00	2.60	16	16	20	Lo qua san.	Same.	Lo Roy li.	100	7,212 67	11,370
13	Frankfort and Utica	Herkimer	5, 8, '00	1.11	15	15	22	Limestone.	Limestone.	Limestone.	100	30,040 00	5,307
14	Hudson Avenue, Sec. 1	Monroe	5, 8, '00	0.637	16	16	22	Limestone.	Limestone.	Limestone.	100	6,192 33	10,321
15	Ulster and Delaware, Sec. 1	Ulster	5, 14, '00	0.66	12	16	16	Lo "ul	Same.	Lo Roy li.	100	27,362 18	8,962
16	Basinger-Ardsley	Westchest.	5, 12, '00	0.60	16	16	22	Lo gran ro.	Limestone.	Limestone.	100	28,014 56	10,006
17	Ardsley-Elmsford	Westchest.	5, 12, '00	2.86	16	16	22	Lo gran ro.	Limestone.	Limestone.	100	31,520 00	9,361
18	Mamaroneck-White Plains	Westchest.	7, 22, '00	3.00	14	23	23	Lo gran ro.	Limestone.	Limestone.	100	10,461 32	7,886
19	White Plains-Armonk	Westchest.	5, 12, '00	3.77	14	14	23	Limestone.	Same.	Limestone.	100	35,507 96	10,413
20	Sauquoit Creek	Onondaga	7, 6, '00	1.33	15	15	22	Limestone.	Same.	Limestone.	100		
21	Sauquoit Creek	Onondaga	7, 6, '00	1.33	15	15	22	Limestone.	Same.	Limestone.	100		
22	Loudon (N. from Albany)	Albany	6, 25, '00	3.41	16	16	22	Limestone.	Same.	Limestone.	100		

River (N from Buffalo)	Erie	7, 26, '00	1, 455	20	26	5, 760	Limestone	Flint & li.	Tap-rock	Flint & li.	100	17, 356 04	11, 904
23 Troy and Brunswick, Sec. 2.	Renewal	7, 16, '01	3, 05	15	21, 25	2, 459	Lo quart.	Sandy loam	Lo quart.	Sandy loam	100	26, 530 00	9, 449
24 Troy and Greenbush, Sec. 2.	Renewal	6, 29, '01	2, 59	16	22	5, 405	Limestone	Same	Tap-rock	Same & G.P.L.	100	22, 688 49	8, 748
25 Orchard Park, Sec. 1.	Erie	9, 27, '00	1, 155	16	22	3, 430	Limestone	Same	Tap-rock	Same	100	14, 619 39	12, 057
26 Southport, Sec. 2.	Channing	7, 17, '01	3, 408	16	20	5, 760	Lo qua. sand.	Same	Tap-rock	Lo Boy li.	100	26, 493 82	11, 984
27 Channing	Channing	7, 17, '01	1, 06	16	20	1, 670	Lo qua. sand.	Same	Tap-rock	Lo Boy li.	100	10, 799 39	10, 577
28 South Branch	Channing	7, 17, '01	1, 021	16	20	1, 600	Lo "b"	Same	Tap-rock	Same	100	41, 728 00	7, 265
29 Uster and Delaware, Sec. 3	Uster	6, 10, '01	5, 72	12, 16	22	3, 234	Lo "b"	Same	Tap-rock	Same	100	17, 510 00	6, 008
30 Amsterdam-Minerva.	Montg.	6, 5, '01	2, 65	12	22	6, 660	Fieldstone	Same	Tap-rock	Same	100	20, 982 00	14, 381
31 Greenville-Maryfeld	Fulton	6, 5, '01	4, 04	16	22	4, 937	Lo gran ro.	Same	Tap-rock	Same	100	26, 000 00	8, 190
32 Adams-Elford, Sec. 2	Westest	6, 31, '01	2, 16	16	22	6, 967	Lo gran ro.	Same	Tap-rock	Same	100	20, 982 00	14, 381
33 White Plains-Armuk, Sec. 2	Westest	7, 22, '01	3, 21	14	20	3, 303	Lo gran ro.	Same	Tap-rock	Same	100	26, 000 00	8, 190
34 Griffin's Corners.	Delaware	6, 18, '01	1, 57	12	16	5, 238	Lo "b"	Same	Tap-rock	Same	100	13, 116 55	5, 854
35 Uster.	Uster	6, 10, '01	4, 00	12	18	3, 125	Lo "b"	Same	Tap-rock	Same	100	22, 881 18	5, 720
36 Saugerties-Woodstock, Sec. 1	Uster	6, 10, '01	4, 00	12	18	3, 125	Lo "b"	Same	Tap-rock	Same	100	22, 881 18	5, 720
37 Saugerties-Woodstock, Sec. 2	Uster	7, 27, '01	4, 90	12	22	3, 267	Lo "b"	Same	Tap-rock	Same	100	22, 881 18	5, 720
38 Waterford-Machville, Sec. 1	Saratoga	7, 16, '01	1, 61	16	24	2, 119	Limestone	Same	Tap-rock	Same	100	15, 532 00	8, 192
39 Clyde (at Turton)	Cortland	6, 5, '01	0, 47	16	24	2, 340	Limestone	Same	Tap-rock	Same	100	3, 430 00	7, 277
40 Delaware Turnpike, Sec. 2.	Albany	6, 5, '01	2, 74	15	22	5, 109	Limestone	Same	Tap-rock	Same	100	22, 497 20	8, 311
41 Newburgh-Woodbury	Orange	6, 18, '01	11, 00	16	22	Emb.	Gravel	None	Gravel	None	100	22, 330 00	2, 060
42 Cochecton Turnpikes	Orange	6, 18, '01	7, 55	43	22	4, 848	Local shale	None	Local shale	None	100	22, 928 00	3, 057
43 Goshen-Florida	Orange	6, 18, '01	4, 22	22	22	4, 502	Gravel	None	Gravel	None	100	9, 690 00	2, 296
44 Middletown-Pine Bush	Orange	6, 18, '01	9, 25	45	16	2, 811	Gravel	None	Gravel	None	100	13, 770 00	1, 499
45 Turners-Monroe	Orange	6, 18, '01	1, 59	16	22	3, 333	Gravel	None	Gravel	None	100	8, 315 02	5, 220
46 Chenango River	Bronze	6, 18, '01	1, 75	16	22	3, 333	Gravel	None	Gravel	None	100	15, 980 00	9, 121
47 West Lake Road	Onondaga	5, 17, '02	2, 00	16	24	4, 160	Fieldstone	Same	Tap-rock	Same	100	9, 100 00	9, 100
48 Watkinsville-McKees Corners	Onondaga	7, 22, '01	4, 44	12	20	5, 315	Lo gran ro.	Same	Tap-rock	Same	100	18, 600 00	9, 300
49 Armonk-Mt. Kisco	Westest	7, 22, '01	4, 44	12	20	5, 315	Lo gran ro.	Same	Tap-rock	Same	100	38, 103 08	8, 552
50 Mt. Kisco-Bedford	Westest	7, 22, '01	4, 44	12	20	5, 315	Lo gran ro.	Same	Tap-rock	Same	100	44, 084 00	8, 745
51 Mt. Kisco-Bedford	Westest	6, 31, '01	3, 09	12	20	5, 065	Lo gran ro.	Same	Tap-rock	Same	100	31, 411 00	8, 512
52 Unkleville-McKees Corners	Westest	6, 31, '01	1, 76	12	20	5, 284	Lo gran ro.	Same	Tap-rock	Same	100	13, 967 94	7, 036
53 McKees Corners-Brian Cliff	Westest	6, 31, '01	1, 76	12	20	5, 284	Lo gran ro.	Same	Tap-rock	Same	100	22, 540 00	8, 505
54 Brian Cliff-Echo Lake	Westest	7, 17, '01	2, 65	12	20	6, 792	Lo gran ro.	Same	Tap-rock	Same	100	10, 854 00	2, 392
55 Hogs Corners	Renewal	7, 16, '01	3, 15	16	22	6, 238	Earth	None	Earth & g.	None	100	18, 910 00	7, 760
56 Flatbush-Kessville, Sec. 1	Clinton	6, 7, '01	2, 83	16	22	3, 121	Limestone	Same	Tap-rock	Same	100	7, 760 00	7, 760
57 Windsor, Sec. 1	Clinton	6, 7, '01	1, 82	16	22	2, 800	Limestone	Same	Tap-rock	Same	100	24, 610 00	5, 711
58 Glens Falls-Saratoga	Saratoga	6, 4, '01	6, 06	12	22	3, 845	Lo gran ro.	Same	Tap-rock	Same	100	34, 032 00	8, 068
59 Westford-Machville, Sec. 2	Saratoga	7, 27, '01	5, 03	16	22	2, 428	Limestone	Same	Tap-rock	Same	100	40, 532 00	8, 068
60 Fairport	Monroe	7, 15, '01	1, 309	16	22	6, 590	Limestone	Same	Tap-rock	Same	100	35, 376 84	11, 540
61 Pittford	Monroe	7, 15, '01	1, 304	16	22	6, 590	Limestone	Same	Tap-rock	Same	100	14, 532 00	8, 068
62 West Henrietta	Monroe	6, 26, '02	6, 237	16	22	3, 447	Limestone	Same	Tap-rock	Same	100	56, 000 00	8, 318
63 Botulville, Sec. 1	Monroe	7, 2, '02	2, 254	16	22	2, 040	Limestone	Same	Tap-rock	Same	100	19, 700 00	8, 740

Note.—Numbers 12 and 24 were canceled.

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS.				Per cent completed.	TOTAL COST COMPLETED.		
								Bottom.		Top.	Kind of screenings or sand as fill r.		Kind of screenings or sand as fill r.	Whol.	Per mile.
								(Usually 4 inches thick after rolling.)	Kind of screenings or sand as fill r.						
64	Walden Scott's Corners.	Orange.	6, 20, '02	1.840	Feet.	Feet.	2,554	Gravel.	None.	Gravel.	None.	100	\$4,968 00	\$2,646	
65	Montgomery-Gresham.	Orange.	6, 20, '02	7.950	16	16	4,302	Gr & br st.	Same.	Gr & br st.	Same.	100	35,712 20	4,492	
66	Orchard Park, Sec. 2.	Erie.	6, 11, '02	0.952	16	20	6,013	Limestone.	Same.	Limestone.	Same.	100	11,000 00	12,185	
67	Orchard Park, Sec. 3.	Erie.	6, 11, '02	3.410	16	20	4,230	Limestone.	Same.	Limestone.	Same.	100	34,900 00	10,234	
68	Orchard Park, Sec. 4.	Erie.	6, 11, '02	1.170	16	20	3,513	Limestone.	Same.	Limestone.	Same.	100	12,723 00	10,879	
69	Main Street, Sec. 1.	Erie.	5, 9, '02	3.415	16	22	1,253	Limestone.	Same.	Limestone.	Same.	100	23,000 00	8,167	
70	Union-Paris.	Ononda.	5, 6, '02	5.230	16	24	4,231	Limestone.	Same.	Trap-rock.	Limestone.	100	47,200 00	9,077	
71	Gasfill Turnpike, Sec. 1.	Tompkins.	5, 9, '03	1.849	16	28	3,210	Flds. one.	Sand & same.	Limestone.	Same.	100	18,000 00	9,631	
72	Quaker Street, Sec. 1.	Schen.	5, 17, '02	1.180	12-16	18-22	13,952	Limestone.	Same.	Limestone.	Same.	100	15,993 00	13,553	
73	Marcellus.	Onondaga.	6, 18, '02	1.000	12	18-22	6,918	Limestone.	Sand & same.	Limestone.	Same.	100	11,047 64	11,048	
74	Fabius-Apulia, Sec. 2.	Onondaga.	5, 17, '02	0.864	16	24	3,939	Limestone.	Sand.	Limestone.	Same.	100	9,150 00	10,590	
75	La Fayette.	Onondaga.	5, 17, '02	1.000	16	24	3,855	Flds. one.	Sand.	Limestone.	Same.	100	7,952 35	7,952	
76	Ala-Wynantkill.	Rensselaer.	5, 6, '02	1.500	16	22	2,340	Local fld.	Sand.	Local fld.	Same.	100	12,180 00	8,120	
77	Cifton, Sec. 1.	Monroe.	7, 2, '02	3.023	16	22	2,445	Limestone.	Sand.	Limestone.	Same.	100	30,998 23	8,555	
78	Scottsville, Sec. 2.	Monroe.	6, 28, '02	7.588	16	22	2,096	Limestone.	Sand.	Limestone.	Same.	100	91,983 00	8,117	
79	Handlin, Sec. 1.	Monroe.	5, 20, '02	4.537	16	22	1,470	San bid'm.	Sand.	Gravel.	Same.	100	39,000 00	8,410	
80	Handlin, Sec. 2.	Monroe.	5, 20, '02	4.037	16	22	1,470	San bid'm.	Sand.	Gravel.	Same.	100	39,000 00	8,257	
81	Buffalo, Sec. 1.	Monroe.	5, 20, '02	0.364	16	25	1,760	Limestone.	Sand.	Limestone.	Same.	100	3,250 00	9,011	
82	Buffalo, Sec. 2.	Monroe.	5, 20, '02	5.089	16	25	1,607	Limestone.	Sand.	Limestone.	Same.	100	41,617 35	8,178	
83	Troy and Brunswick, Sec. 3.	Monroe.	5, 12, '02	2.460	16	22	2,235	Local quart.	Sandy loam.	Local quart.	Same & sand.	100	22,239 16	9,048	
84	Ft. Edward-Sandy Hill.	Wash.	6, 12, '02	0.920	18	22	1,521	Local li.	Sand.	Local li.	Same.	100	10,236 19	11,158	
85	Big Tree.	Erie.	6, 11, '02	4.004	16	22	4,461	Lo bid'm.	Limestone.	Gravel.	Limestone.	100	42,500 00	10,614	
86	Main Street, Sec. 2.	Erie.	5, 9, '02	1.923	16	22	986	Limestone.	Same.	Limestone.	Same.	100	17,000 00	8,823	
87	Transit, Sec. 1.	Erie.	5, 9, '02	4.253	16	22	1,909	Limestone.	Same.	Limestone.	Same.	100	39,235 80	9,154	
88	Transit, Sec. 2.	Erie.	5, 9, '02	4.063	16	22	2,230	Limestone.	Same.	Limestone.	Same.	100	41,422 00	10,121	
89	Grassy Point.	Erie.	6, 12, '02	2.830	16	22	3,180	Local li.	Same.	Trap-rock.	Limestone.	100	23,662 00	8,372	
90	Rockland.	Rockland.	6, 12, '02	3.900	16	22	2,179	Lo gran ro.	Sand.	Lo gran ro.	Same.	100	29,850 00	7,649	
91	Nyack Turnpike.	Rockland.	6, 20, '02	3.900	16	22	3,793	Limestone.	Li & sand.	Limestone.	Li & sand.	100	17,635 00	10,132	
92	D'Imar-Slingerlands.	Albany.	6, 12, '02	1.740	16	22	3,793	Limestone.	Li & sand.	Limestone.	Li & sand.	100	17,635 00	10,132	
93	Florida-Warwick.	Orange.	6, 20, '02	4.670	14-16	22	6,139	Gr. sh. br st.	Same.	Gr. sh. br st.	Same.	100	27,855 00	8,873	
94	Monroe Avenue.	Monroe.	6, 9, '02	4.223	14-16	22, 24	1,850	Limestone.	Same.	Limestone.	Same.	100	35,400 00	8,376	

TABLE OF CONTRACTS AWARDED—HIGHWAY IMPROVEMENT. 55

95	Middletown-Goshen.....	Orange.....	6, 20, '03	5,860	13-14	22	5,358	Same.....	Gr. br st.....	Same.....	100	34,230 50	5,842
96	Amsterdam-Minerva, Sec. 2.....	Montg.....	5, 17, '03	0,644	12	22	8,540	Local fld.....	Local fld.....	Same.....	100	6,430 00	9,981
97	Shunpike Road.....	Wash.....	5, 12, '03	3,610	13	22	4,155	Local quart.....	Local quart.....	Same.....	100	26,735 60	7,406
98	Webster, Sec. 1.....	Monroe.....	5, 20, '02	1,576	14-16	20, 22	4,700	Limestone.....	Limestone.....	Same.....	100	19,800 00	12,437
99	Webster, Sec. 2.....	Monroe.....	6, 3, '02	2,960	14-16	21	2,000	Limestone.....	Limestone.....	Same.....	100	22,800 00	11,081
100	Webster, Sec. 3.....	Monroe.....	7, 1, '02	3,398	16	22	1,324	San b'd'ra.....	San b'd'ra.....	Same.....	100	20,166 00	8,583
101	Webster, Sec. 4.....	Monroe.....	7, 1, '02	2,879	16	22	2,018	San b'd'ra.....	San b'd'ra.....	Same.....	100	23,374 70	8,119
102	Barracks.....	Rensselaer.....	5, 25, '02	2,060	8-12	16-22	6,300	Trap-rock.....	Trap-rock.....	Same.....	100	24,015 00	11,714
103	Granville-Middle Granville.....	Wash.....	5, 7, '03	1,310	16	22	2,061	Local quart.....	Local quart.....	Same.....	100	10,143 00	7,742
104	Granville and Troy Stage.....	Wash.....	5, 12, '03	1,250	16	22	3,088	Limestone.....	Limestone.....	Same.....	100	10,850 00	8,690
105	Quaker Street, Sec. 2.....	Schen.....	5, 17, '02	0,348	14-16	18-22	2,636	Limestone.....	Limestone.....	Same.....	100	2,460 00	7,048
106	Quaker Street, Sec. 3.....	Schen.....	5, 17, '02	0,132	14-16	18-22	1,742	Limestone.....	Limestone.....	Same.....	100	1,255 00	9,985
107	Fultonville-Glen.....	Montg.....	5, 12, '02	3,660	14-16	17-20-22	6,421	Li & lo fld.....	Li & lo fld.....	Same.....	100	36,545 00	9,478
108	West Mohawk River.....	Montg.....	5, 12, '02	2,350	14-16	20-22	3,938	Trap-rock.....	Trap-rock.....	Same.....	100	30,788 00	9,473
109	Argersinger.....	Fulton.....	5, 21, '02	2,300	14	21	2,478	Local fld.....	Local fld.....	Same.....	100	17,681 54	7,698
110	Briggs.....	Fulton.....	5, 21, '02	2,250	14	21	2,478	Local fld.....	Local fld.....	Same.....	100	17,316 50	7,696
111	Blodgett's Mills.....	Cortland.....	5, 23, '02	0,750	12	22	4,400	Lo qua san.....	Lo qua san.....	Same.....	100	6,100 00	8,133
112	Norwich-Plymouth.....	Chenango.....	5, 23, '02	4,842	12	22	3,923	Trap-rock.....	Trap-rock.....	Same.....	100	40,900 00	8,447
113	Cochecton, Sec. 1.....	Orange.....	5, 21, '02	2,240	12	22	7,511	Local li.....	Local li.....	Same.....	100	23,603 14	10,346
114	Middletown-Pine Bush, Sec. 2.....	Orange.....	5, 21, '02	1,210	12	22	3,140	Local shale.....	Local shale.....	None.....	100	4,106 80	3,311
115	Central Valley-Turner, Sec. 1.....	Orange.....	5, 21, '02	2,120	12	22	6,870	Gravel.....	Gravel.....	None.....	100	31,117 00	11,877
116a	Kingston-Rifton.....	Ulster.....	5, 19, '02	4,180	14	18-20	3,792	Lo san, trap.....	Lo san, trap.....	Limestone.....	100	40,059 59	9,593
116b	Kingston-Rifton.....	Ulster.....	5, 19, '02	0,89	14	18-20	2,247	Trap-rock.....	Trap-rock.....	Limestone.....	100	7,893 00	8,534
117	Ulster-Delaware, Sec. 2.....	Ulster.....	5, 15, '02	5,090	12-14	20-22	4,420	Lo "bi".....	Lo "bi".....	Same.....	100	55,100 00	10,325
118	Shandaken-Hurley, Sec. 1.....	Ulster.....	5, 20, '02	4,000	14	20	2,300	Lo "bi".....	Lo "bi".....	Same.....	100	34,757 00	9,689
119	Loudon, Sec. 2.....	Albany.....	5, 21, '02	3,920	16	22	2,777	Lo san.....	Lo san.....	Same.....	100	37,500 00	9,566
120	Cannjoharie-Sharon Springs.....	Montg.....	5, 22, '02	4,140	14	22	2,099	Lo fld.....	Lo fld.....	Same.....	100	36,546 70	8,828
121	Fabi's Aquila, Sec. 3.....	Onondaga.....	5, 1, '02	1,160	16	22	2,881	Limestone.....	Limestone.....	Same.....	100	9,950 00	8,577
122	East Lake.....	Onondaga.....	5, 18, '02	1,000	12	24	2,407	Li, quart, fld.....	Li, quart, fld.....	Same.....	100	9,500 00	9,500
123	Preble-Homer.....	Cortland.....	5, 23, '02	1,220	12	23	3,246	Li & lo fld.....	Li & lo fld.....	Same.....	100	8,692 17	7,067
124	North.....	Albany.....	5, 12, '02	1,840	14	20	2,902	Feldstone.....	Feldstone.....	Same.....	100	14,412 06	7,832
125	Lesterhire.....	Broome.....	7, 2, '02	2,955	16	22	2,902	Feldstone.....	Feldstone.....	Limestone.....	100	28,800 00	9,746
126	Town Line Extension.....	Broome.....	7, 28, '03	1,970	12, 16	24, 26	1,751	Feldstone.....	Feldstone.....	Trap-rock.....	100	19,260 80	9,777
127	Park Bridge.....	Broome.....	7, 28, '03	2,076	16	26	2,317	Trap-rock.....	Trap-rock.....	Trap-rock.....	100	24,532 71	11,817
128	Aurora-Buffalo, Sec. 1.....	Broome.....	7, 6, '03	5,573	16	26	2,055	Limestone.....	Li & granite.....	Limestone.....	100	53,567 13	9,612
129	River, Sec. 2-3.....	Broome.....	6, 22, '03	3,015	16	22	1,459	Limestone.....	Trap-rock.....	Limestone.....	100	26,013 00	8,627
130	Main Street, Sec. 3.....	Erie.....	7, 10, '03	6,625	16	22	1,195	Limestone.....	Limestone.....	Same.....	100	38,181 08	6,788
131	Main Street, Sec. 4.....	Erie.....	7, 10, '03	6,581	16	22	1,302	Limestone.....	Limestone.....	Same.....	100	50,739 61	7,710
132	Genesee Turnpike.....	Onondaga.....	7, 30, '03	1,180	16	26	1,403	Limestone.....	Trap-rock.....	Limestone.....	100	9,600 00	8,495
133	Little Falls-Dolgeville.....	Herkimer.....	6, 10, '03	2,290	14	20	2,020	Lo gneiss.....	Lo gneiss.....	Same & li.....	100	19,504 65	8,517
134	Fenton.....	Broome.....	7, 29, '03	2,170	12, 16	24, 26	1,876	Feldstone.....	Trap-rock.....	Trap-rock.....	100	21,716 20	10,007
135	Violet Avenue.....	Dutchess.....	6, 19, '03	3,290	14	20	3,131	Local fld.....	Trap-rock.....	C'ta Pt. li.....	100	31,801 91	9,666

Note.—Number 70 canceled.

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS.				Per cent completed.	TOTAL COST COMPLETED.	W o c.	Per mile.
								Bottom. (Usually 4 inches thick after rolling.)		Top. (Usually 2 inches thick after rolling.)					
								Kind of crushed rock.	Kind of screenings or sand as fill r.	Kind of crushed rock.	Kind of screenings or sand as filler.				
136	Windsor, Sec. 2	Clinton	6, 23, '03	1.750	16	22	Emb. 1,886	Local li.	Same.	Local li.	Same.	100	\$14,013 00	\$8,008	
137	Plattsburgh-Knoxville, Sec. 2.	Clinton	6, 16, '03	4.520	16	22	Emb. 2,434	Local san.	Sand.	Local san.	Same.	100	36,010 36	7,967	
138	Plattsburgh-Moores, Sec. 1.	Clinton	6, 16, '03	7.570	14-16	20-22	3,157	Local san.	Same.	Local san.	Same.	100	64,796 89	8,558	
138a	Plattsburgh-Moores, Sec. 1.	Clinton	1, 3, '05	7.570	14-16	20-22	3,157	Local san.	Same.	Local san.	Same.	100	8,150 18	1,076	
139	Hamilton Bridge.	Oneida	6, 24, '03	1.230	12, 16	24, 25	2,884	Fieldstone	Sa. dy & same.	Limestone.	Same.	100	10,499 39	8,139	
140	Seneca Turnpike	Oneida	10, 9, '03	2.230	12, 16	24, 26	2,135	Limestone.	Sand & same.	Limestone.	Sand & same.	100	15,600 00	6,945	
141	Kington-Ellenville, Sec. 3.	Ulster	6, 16, '03	6.820	12-14	20	Emb. 4,780	Lo "bl" & li.	Sand.	Lo "bl" & li.	Same.	100	63,876 96	9,358	
142	Saugerties-Woodstock, Sec. 3.	Ulster	6, 16, '03	2.850	14	22	5,253	Local "bl"	Sand.	Trap-rock.	Bluestone.	100	39,317 12	13,795	
143	Echo Lake-Pines Bridge.	Watshat.	6, 15, '03	3.140	12	20	6,051	Lo gran ro.	Same.	Lo gran ro.	Same.	100	30,430 00	9,091	
144	Bedford-Cross River.	Watshat.	6, 19, '03	5.300	12-14	20	6,004	Lo gran ro.	Same.	Lo gran ro.	Same.	100	47,333 07	8,931	
145	Delaware River.	Delaware	7, 28, '03	1.000	16	22-24	6,545	Gravel.	None.	Lo gran ro.	None.	100	6,240 00	6,240	
146	Geneva-Canandaigua, Sec. 1.	Ontario	6, 15, '03	5.624	14	22	1,547	Le Roy li.	Same.	Le Roy li.	Same.	100	40,525 79	7,223	
147	Burr's Mills.	Jefferson	8, 7, '03	3.923	12, 14	24	3,724	Limestone.	Sand & same.	Limestone.	Same.	100	23,700 00	6,811	
148	Pine Bridge-York's Heights.	Watshat.	6, 16, '03	3.490	12	20	5,014	Lo gran ro.	Same.	Lo gran ro.	Same.	100	33,543 41	9,611	
148a	Pine Bridge-York's Heights.	Watshat.	10, 5, '05	3.490	12	20	3,353	Local fd.	Sand.	Local fd.	Same.	100	53,500 00	182	
149	York's Heights-Putnam Co.	Watshat.	6, 16, '03	6.620	12-14	20	6,575	Lo gran ro.	Sand.	Lo gran ro.	Same.	100	51,232 71	7,739	
150	Cross River-Turk Hill.	Watshat.	6, 19, '03	3.270	12-14	20	6,102	Lo gran ro.	Sand.	Lo gran ro.	Same.	100	31,717 17	9,700	
151	Turk Hill-Putnam Co. Line.	Watshat.	6, 19, '03	5.990	12	20	2,560	Local fd.	Sand.	Local fd.	Same.	86	19,333 00	7,733	
152	Fonda "East."	Montg.	6, 20, '03	2.500	16	22	4,454	Local fd.	Same.	Local fd.	Same.	100	86,816 67	6,498	
153	Newburgh-Campbell Hall	Orange	6, 24, '03	13.380	12	20	4,917	Local fd.	None.	Local fd.	None.	100	51,837 23	4,511	
154	Chatter-Vails Gate.	Orange	6, 24, '03	11.490	12	20	4,800	Local fd.	Sand.	Local fd.	Same.	100	24,016 77	9,006	
155	Fonda "West."	Montg.	6, 20, '03	2.500	16	22	Emb. 10,097	Gravel.	None.	Gravel.	None.	100	25,595 37	8,256	
156	Chatter-Graham.	Orange	7, 12, '04	3.10		22	Emb. 4,741	Gravel.	None.	Gravel.	None.	32			
157	Woodbury-Central Valley.	Orange	7, 20, '06	3.48	18	22	Emb. 4,741	Gravel.	None.	Gravel.	None.				

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158	Northampton	Montg.	9, 1, '06	0.70	12	22	2,416	Local fld.	Sand	Local fld.	Same	100	15,845 90	4,569
159	Middletown-Slate Hill	Orange	6, 15, '04	3.49	12	22	5,781	Gravel	None	Gravel	None	100		
160	Slate Hill-Unionville	Orange	6, 18, '04	8.38	12	22	5,609	Gravel	None	Gravel	None	99		
161	Newburgh-Shawangunk	Orange	6, 18, '04	8.61	12	22	5,609	Gr & br st.	Same	Gr & br st.	Same	78		
162	Oenonta	Oreago	6, 9, '04	1.39	14	20	2,968	Local stone	Sand	Local stone	Limestone	100	11,860 57	8,533
163	Broadway-Fort Hunter	Schen.	6, 17, '04	1.71	16	22	2,183	Limestone	Sand	Limestone	Same	100	14,907 00	8,717
164	Downsville	Delaware	6, 14, '04	4.20	16	18	6,000	Sandstone	Sand & sam.	Granite	Gran & sam.	100	14,972 38	7,261
165	Little Ridge, Sec. 2	Monroe	6, 14, '04	2.02	16	22	1,625	Limestone	Sand	Limestone	Same	100	29,337 13	8,071
166	Pendfield, Sec. 1	Monroe	6, 7, '04	3.635	14-16	21-22	3,411	Local fld.	Sand	Granite	Same	100	32,200 00	6,061
167	Pendfield, Sec. 2	Monroe	6, 17, '04	5.313	12-14-16 18-20-22	20	2,070	Local fld.	Sand	Granite	Same	100		
168	Dugway, Sec. 1	Monroe	6, 17, '04	3.300	14-15-16 20-21-22	22	8,258	Local fld.	Sand	Local li.	Same	100	34,800 00	10,545
169	Dugway, Sec. 2	Monroe	6, 18, '04	4.019	12	18	1,592	Local li.	Sand	Local li.	Same	100	21,012 75	5,238
170	Dugway, Sec. 3	Monroe	6, 17, '04	2.88	12	18	1,774	Local li.	Sand	Local li.	Same	100	15,374 36	5,338
171	Lake, Sec. 1	Monroe	6, 14, '04	2.00	16	22	1,915	Local li.	Sand	Local li.	Same	100	14,368 92	7,199
172	Portland Avenue, Sec. 1	Monroe	10, 15, '04	0.703	16	22	2,237	Local li.	Sand	Local li.	Same	100	7,391 20	10,513
173	Hudson Avenue, Sec. 2	Monroe	10, 15, '04	0.965	16	22	1,420	Limestone	Sand	Limestone	Same	100	9,099 86	9,115
174	Endicott	Broome	6, 16, '04	2.17	16	22-27	3,180	Fieldstone	Same	Trap-rock	Limestone	100	22,500 00	10,368
175	Chemango Tow-path	Broome	6, 16, '04	1.836	12	16	1,514	Fieldstone	Same	Trap-rock	Limestone	100	13,492 10	7,348
176	Albany-Schenectady	Albany	7, 28, '04	2.31	16	32	2,165	Limestone	Sand	Limestone	Same	100	21,447 00	9,284
177	Schoharie, Sec. 1-2	Albany	6, 9, '04	5.00	14-16	20-22	3,240	Local fld.	Sand	Limestone	Same	100	42,921 55	8,544
178	Delaware Turnpike, Sec. 3	Albany	6, 8, '04	7.38	12	20	5,312	Limestone	Sand	Limestone	Same	100	85,896 28	11,637
179	Schenectady-Albany	Schen.	6, 17, '04	2.35	16	32	3,830	Limestone	Sand	Limestone	Same	100	28,510 67	12,132
180	East Mohawk Turnpike	Montg.	6, 17, '04	2.82	16	22	3,794	Limestone	Sand	Limestone	Same	100	23,175 03	9,283
181	W'n-S. H'y-Hend'n, Sec. 1	Jefferson	6, 16, '04	6.04	12	20	3,013	Limestone	Sand	Limestone	Same	100	47,848 30	7,923
182	Redwood-Alex. Bay, Sec. 1	Jefferson	7, 14, '04	2.976	12	25	1,613	Local san.	Sand & sam.	Lo qua gran.	Same	100	30,645 57	10,297
183	Adams-Henderson, Sec. 1	Jefferson	6, 18, '04	3.08	12	26	2,706	Gran b'd'rs.	Sand & sam.	Gran b'd'rs.	Same	100	21,900 00	7,228
184	Pierpont Manor-Ellisburg	Jefferson	6, 16, '04	2.955	12	26	2,809	Gran b'd'rs.	Sand	Limestone	Same	100	21,321 45	7,119
185	State	Jefferson	6, 15, '04	1.0	12	26	5,800	Gran b'd'rs.	Sand	Gran b'd'rs.	Same	100	8,792 15	8,792
186	Depot	Jefferson	10, 19, '04	1.028	19-16	26	2,043	Limestone	Sand	Limestone	Same	100	6,900 00	6,615
187	Bristol	Ontario	6, 11, '04	1.720	12-16		2,443	La Roy li.	Sand	La Roy li.	Same	100	15,517 23	9,023
188	Bristol Valley, Sec. 1	Ontario	7, 14, '04	4.880	12	18	2,600	Lo fld.	Sand	Lo gran fld.	Same	100	39,346 56	8,146
189	East Side-Lake, Sec. 2	Ontario	6, 10, '04	1.286	12	18	2,177	La Roy li.	Sand	La Roy li.	Same	100	11,092 66	8,626
190	East Side-Lake, Sec. 1	Ontario	6, 10, '04	2.368	12	18	1,848	Lo fld.	Sand	Lo fld.	Same	100	18,200 00	7,685
191	Honeyoy-Hemlock	Ontario	6, 17, '04	4.549	12	18	3,523	Gran b'd'rs.	Sand	Gran b'd'rs.	Same	100	38,642 82	8,499
192	Beaver Dam	Albany	6, 9, '04	3.54	14	20	3,616	Limestone	Sand	Limestone	Same	100	35,867 04	10,031
193	River	Albany	6, 11, '04	8.13	12-14-16	23	4,065	Limestone	Sand	Trap-rock	Limestone	100	99,055 56	8,463
194	Sand Lake-Troy	Rensselaer	6, 10, '04	1.49	14-20	22	3,812	Limestone	Sand	Limestone	Same	100	15,042 55	10,096
195	Wynantkill-W. Sand Lake	Rensselaer	6, 23, '04	4.01	14	18	3,092	Limestone	Sand	Limestone	Same	91		
196	East Nassau	Rensselaer	6, 23, '04	3.02	18	18	3,844	Gravel	None	Gravel	None	100	14,252 50	4,719
197	Brick Church-Rock Hollow	Rensselaer	6, 13, '04	6.833	20	20	3,172	Local fld.	Sand	Local fld.	Same	100	33,440 94	10,042
198	Delaware Turnpike, Sec. 4	Albany	6, 13, '04	6.537	12	20	6,833	Limestone	Sand	Limestone	Same	100	66,967 87	10,260
199	Delaware Turnpike, Sec. 5	Albany	6, 9, '04	7.871	12	20	4,823	Local stone	Sand & sam.	Local stone	Same	100	61,070 47	7,768
200	Old Northern Turnpike	Rensselaer	7, 12, '04	2.75	14-20	20	2,746	Limestone	Sand	Limestone	Same	100	26,244 31	9,543

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS.				Per cent completed.	TOTAL COST COMPLETED.	
								Bottom. (Usually 4 inches thick after rolling.)		Top. (Usually 2 inches thick after rolling.)			Whole.	Per mile.
					Feet.	Feet.		Kind of crushed rock.	Kind of screenings or sand as filler.	Kind of crushed rock.	Kind of screenings or sand as filler.			
201	Troy-Powstenkill.	Rensselaer.	6, 13, '04	3.60	14-16	22	2,014	Limestone.	Sand.	Limestone.	Same.	81	\$51,264.27	\$9,458
202	Boston-Albany.	Rensselaer.	6, 20, '04	5.42	16	30	3,000	Local shale.	Sand.	Trap-rock.	Local shale.	100	10,000.00	110
203	Brooklyn-Albany.	Rensselaer.	4, 30, '06	5.42								100	19,205.27	8,783
204	Goletan-Stanley.	Ontario.	6, 10, '04	2.107	12-16	18-22	3,500	Le Roy li.	Sand.	Le Roy li.	Same.	100	3,348.84	9,143
205	Naples-Albany.	Ontario.	6, 11, '04	0.585	12	18	1,538	Le Roy li.	Sand.	Le Roy li.	Same.	100	30,000.00	11,301
206	Naples-Woodville.	Ontario.	6, 16, '04	3.451	12	18	5,308	Local li.	Sand.	Local li.	Same.	100		
207	Reeds Corners.	Ontario.	7, 10, '06	2.669	12	18	1,922	Local li.	Sand.	Local li.	Same.	53		
208	Geneva-Cornwall.	Ontario.	7, 14, '04	6.213	14	22	2,245	Local li.	Sand.	Local li.	Same.	100	52,432.38	8,438
209	Geneva-Homer.	Ontario.	7, 14, '04	6.213										
210	Norwich.	Broome.	6, 10, '04	0.934	16	24-28	1,832	Feldstone.	Same.	Limestone.	Same.	100	7,539.68	8,072
211	Harpurville.	Broome.	6, 10, '04	0.85	16-20	24-28	3,647	Feldstone.	Same.	Limestone.	Same.	100	11,281.63	13,272
212	Center Village.	Broome.	6, 10, '04	0.574	12-16	24	4,007	Feldstone.	Same.	Limestone.	Same.	48		
213	Onondaga.	Broome.	6, 10, '04	1.01	12-16	24	3,218	Feldstone.	Same.	Limestone.	Same.	85		
214	River Road, Windsor, Sec. 2.	Broome.	6, 10, '04	2.828	16	28	4,102	Feldstone.	Same.	Limestone.	Same.	96		
215	River Road, Windsor, Sec. 1.	Broome.	6, 10, '04	1.808	14	28	4,122	Feldstone.	Same.	Limestone.	Same.	99		
216	Dryden.	Columbia.	6, 13, '04	2.00	16	28	2,250	Feldstone.	Same.	Limestone.	Same.	100	15,412.00	7,706
217	Roxbury.	Delaware.	7, 14, '04	0.95	18-35	18-35	1,821	Local li.	Same.	Local li.	Same.	100	10,787.29	11,365
218	Grand Gorge.	Delaware.	7, 14, '04	1.00	14	20	2,820	Local li.	Sand.	Local li.	Same.	100	9,569.47	9,569
219	Greene-Spoilville Flats.	Delaware.	7, 13, '04	4.68	14	23	3,205	Local li.	Sand.	Limestone.	Local li.	100	27,700.00	8,065
220	Richfield-Spoilville Flats.	Delaware.	8, 6, '04	0.68	12	23	3,205	Limestone.	Sand.	Limestone.	Local li.	100	6,488.33	7,541
221	Warrior.	Delaware.	7, 14, '04	0.98	16-20	22-26	1,880	Limestone.	Sand.	Limestone.	Same.	100	10,782.61	10,972
222	Edinboro.	Delaware.	6, 14, '04	0.50	22	24	2,500	Cr. sh. li.	Same.	Limestone.	Same.	100	10,782.61	14,442
223	Hughesville.	Dutchess.	6, 13, '04	3.407	14-20	20	3,547	Feldstone.	Sand.	Feldstone.	Same.	100	31,979.04	9,224
224	South.	Dutchess.	7, 20, '04	3.904	16	22	2,869	Limestone.	Sand.	Trap-rock.	Limestone.	100	44,301.79	11,347
225	Oxford-McDonough.	Chemango.	7, 9, '04	5.82	10	22	2,577	Feldstone.	Same.	Local li.	Same.	100	37,548.06	6,451
226	Guilford.	Chemango.	7, 12, '04	5.75	12-16	26-28	1,922	Feldstone.	Sand.	Limestone.	Feldstone.	95		
227	Brunswick Turnpike.	Rensselaer.	7, 9, '06	3.100	14	24-28	2,188	Local stone.	Sand.	Trap-rock.	Local stone.	19		
228	Saugerties-Kingston.	Ulster.	6, 20, '06	5.66	14, 16	24, 26, 28	2,814	Local stone.	Sand.	Local stone.	Same.	18		
229	Kingston-Elleville, Sec. 1.	Ulster.	7, 11, '06	8.27	16	24, 26, 28	3,064	Local stone.	Sand.	Local stone.	Same.			
230	Post, Sec. 1.	Ulster.	7, 7, '06	7.08	14	20	3,539	Local stone.	Sand.	Local stone.	Same.	6		

TABLE OF CONTRACTS AWARDED — HIGHWAY IMPROVEMENT. 59

332	Old State	7, 9, '06	2.64	14	28, 30	1, 984	Local stone	Sand	Local stone	Same	45	.....
333	Frankford E. Schuyler	7, 9, '06	1.64	16	26	2, 043	Local stone	Sand	Trap-rock	Same	11	.....
334	Adams-Henderson, Sec. 2	7, 7, '06	6.86	12	23-26	2, 2, 9	Emb.	.....	.....	.....	.....	.....
235	Wat'n-Sack Harbor-Hd'n, Sec. 2	7, 7, '06	2.23	12, 16	26	1, 009	Local stone	Sand	Limestone	Same	28	.....
237	Sackett's Harbor	7, 9, '06	1.45	16	26	2, 207	Local stone	Sand	Limestone	Same	51	.....
238	Henderson Harbor	7, 7, '06	5.09	12	22, 24	1, 660	Local stone	Sand	Limestone	Same	.....	.....
239	Delhi-Middleton	8, 30, '06	4.96	14, 16	25, 35	5, 586	Concrete	Sand	Local stone	Same	.....	.....
240	Chico-Waerford	7, 3, '06	1.00	35	35	2, 193	Vit. brick	.....	.....	.....	56	.....
241	Saratoga-Ballston	7, 13, '06	4.335	16	32	1, 986	Local stone	Sand	Trap-rock	Same	.....	.....
242	Saratoga-Glen Falls, Sec. 2	7, 13, '06	1.26	16	32	2, 301	Local stone	Sand	Trap-rock	Same	.....	.....
243	Mechanicville-Stillwater	7, 9, '06	1.84	16	28	3, 960	Local stone	Sand	Trap-rock	Same	2	.....
244	Saratoga-Schuyler	7, 9, '06	6.01	14	24, 26	3, 861	Stone	Sand	Trap-rock	Stone	6	.....
245	Gloversville-Meco-Puella	7, 12, '06	2.03	14, 16	26	2, 380	Stone	Sand	Trap-rock	Stone	6	.....
247	Johnstown-Keck's Center	7, 9, '06	4.67	12, 14	22, 24	5, 001	Local stone	Sand	Local stone	Same	.....	.....
248	Gloversville-Broadbalm	9, 1, '06	2.02	12, 14	24	3, 676	Local stone	Sand	Local stone	Same	.....	.....
249	Old Plank	7, 6, '06	3.14	14, 24, 26, 32	3, 493	Local stone	Sand	Local stone	Local stone	Same	24	.....
250	Utica-Oneida Castle, Sec. 1	7, 10, '06	8.53	16-23, 22, 23	18	1, 817	Local stone	Sand	Limestone	Same	13	.....
251	Grainold Street	7, 5, '06	3.15	12	18	1, 817	Lo fd	Sand	Limestone	Same	77	.....
252	Clinton, Sec. 2	7, 11, '06	2.92	12	30	2, 3, 0	Lo fd	Sand	Limestone	Same	.....	.....
253	Lyeil	7, 11, '06	3.11	16, 20	26, 30	2, 951	Lo fd	Sand	Limestone	Same	.....	.....
254	Chili, Sec. 1	7, 11, '06	2.56	16, 18	22	2, 285	Lo fd	Sand	Limestone	Same	.....	.....
255	Chili, Sec. 2	7, 11, '06	3.60	16, 18	22	1, 405	Lo fd	Sand	Local gran.	Same	.....	.....
256	Little Ridge, Sec. 3	7, 13, '06	3.36	16	22	1, 339	Lo fd	Sand	Local gran.	Same	.....	.....
257	Little Ridge, Sec. 4	7, 11, '06	5.44	14, 16	28-32	1, 817	Local stone	Sand	Local stone	Same	.....	.....
258	Plattsburg-Keeseville	7, 9, '06	7.34	14	28	2, 535	Local stone	Sand	Limestone	Same	10	.....
259	Plattsburg-Moorea, Sec. 2	7, 6, '06	4.31	14	28	2, 535	Local stone	Sand	Limestone	Same	1	.....
260	Plattsburg-Moorea, Sec. 3	8, 1, '06	5.86	14, 16	24-32	2, 123	Local stone	Sand	Local stone	Same	.....	.....
261	Pretakill-Salem Center, Sec. 1	7, 6, '06	4.66	14, 16	24	1, 928	Local stone	Sand	Local stone	Same	13	.....
262	Pretakill-Salem Center, Sec. 2	7, 6, '06	4.23	16	23-32	2, 381	Lo fd	Sand	Limestone	Same	.....	.....
263	Aurora-Buffalo, Sec. 2	7, 18, '06	0.74	16	22	2, 007	Lo fd	Sand	Limestone	Same	.....	.....
264	Aurora-Buffalo, Sec. 3	7, 18, '06	2.78	14	23	3, 381	Fieldstone	Same	Trap-rock	Limestone	19	.....
265	Deposit	7, 12, '06	1.70	12	28	2, 523	Emb.	.....	.....	.....	.....	.....
266	Tunnel	7, 12, '06	6.00	12	23-28	2, 133	Fieldstone	Same	Fld.	Same	16	.....
267	Castle Creek	7, 12, '06	1.00	12, 16	28, 28	3, 447	Fieldstone	Same	Trap-rock	Limestone	66	.....
268	Bridge	7, 12, '06	4.30	16	32	3, 095	Lo fd	Sand	Local gran.	Same	.....	.....
269	Hilton	7, 11, '06	1.16	16	32	3, 095	Trap-rock	Sand	Trap-rock	Same	45	.....
270	Birch Hill	6, 10, '06	8.53	16	32	2, 849	Trap-rock	Sand	Trap-rock	Same	.....	.....
271	Utica-Oneida Castle, Sec. 2	7, 13, '06	1.21	16	32	2, 256	Limestone	Sand	Limestone	Same	80	.....
272	Orchard Park, Sec. 5	7, 10, '06	1.75	12	24-26	4, 514	Emb.	.....	.....	.....	.....	.....
273	Gulf Bridge, Sec. 1	7, 12, '06	3.04	12	24	3, 476	Emb.	.....	.....	.....	.....	.....
275	Union-Maine	7, 12, '06	3.04	12	24	3, 476	Emb.	.....	.....	.....	.....	.....
276	Barnard's Crossing, Secs. 1 and 2	7, 13, '06	4.14	16	22	2, 174	Lo fd	Sand	Limestone	Same	27	.....

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards of excavation per mile.	MATERIALS.				Total Cost Construction.	
								Bottom. (Usually 4 inches thick after rolling.)	Top. (Usually 2 inches thick after rolling.)	Per cent completed.	Whole.	Per mile.	
								Kind of crushed rock or sand as filler.	Kind of screenings or sand as filler.				
277	Lake Pleasant-Speculator	Hamilton.	7, 12, '06	3.44	12	26	Emb. 3,427	Local stone	Local stone	2			
280	Owego-Sterling	Owego	9, 18, '06	1.66	16	26	Emb. 1,386						
282	Greenville-State Hill	Orange	8, 20, '06	7.13	12	26	5,007	Local stone	Local stone				
283	Greenville-Port Jervis	Orange	9, 4, '06	5.11	12	26	8,305	Local stone	Local stone				
284	Averill Park-Crooked Lake	Rensselaer	7, 2, '06	3.61	14, 16, 20	26	2,431	Local stone	Local stone	6			
285	Nassau-Braintree	Rensselaer	7, 7, '06	3.66	12	24-26	5,607	Local stone	Local stone	12			
287	Rensselaer-East	Rensselaer	8, 30, '06	4.75	12	26	3,023	Local stone	Local stone				
288	Troy-Sand Lake, Sec. 2	Rensselaer	7, 3, '06	3.72	18	26	2,029	Gravel	Gravel	30			
290	South Salina Street	Onondaga	8, 31, '06	1.06	16	26	1,961						
292	West Lake, Sec. 2	Onondaga	7, 10, '06	1.00	16	26	2,500						
293	East Lake, Sec. 2	Onondaga	7, 10, '06	1.00	16	26	2,100	Fieldstone	Limestone	6			
295	Mohawk River Road, Floyd	Oswego	7, 10, '06	2.80	16	26	2,929	Limestone	Gneiss				
296	Mohawk River Road, Marcy	Oswego	7, 10, '06	4.54	16	26	2,844	Limestone	Gneiss	4			
297	Mohawk River R'd, Deerfield	Oswego	7, 10, '06	3.74	16	26	1,568	Limestone	Gneiss	47			
298	Amsterdam-Hagaman	Montg.	7, 9, '06	2.20	14	24	1,856	Local stone	Local stone				
299	Saratoga's Cove-Young's Cove	Montg.	7, 11, '06	2.77	12	22	4,084	Local stone	Local stone				
300	DeGraff's Cove-Sherburne's Cove	Montg.	7, 11, '06	1.13	12	22	2,040	Local stone	Local stone	30			
301	Minerva's South Bush	Montg.	7, 9, '06	2.34	12, 22, 24, 26	26	1,747	Local stone	Local stone	15			
302	Fonda-Berryville	Montg.	7, 9, '06	2.00	12, 14	24	3,205	Local stone	Trap-rock	20			
305	Kings-on-Elkville, Sec. 2	Ulster	7, 3, '06	7.25	16, 22, 26	22	4,218	Local stone	Local stone	1			
312	Middlebrook-Cuddebackville, Sec. 1	Orange	9, 4, '06	4.366	12	26	4,595	Local stone	Local stone				
314	Gilbertsville-Mt. Union	Oswego	8, 30, '06	4.37	16	26-28	3,368	Local stone	Local stone				

TABLE OF CONTRACTS AWARDED — HIGHWAY IMPROVEMENT. 61

315	Morris-Gilbertville, Sec. 1.	Otsego.	7, 9, '06	3, 537	16	24-26	2, 679	Local stone.	Sand	Local stone.	Same.	8
316	Collins-Bannock.	Otsego.	7, 10, '06	1, 26	16	26-28	3, 069	Local stone.	Sand	Local stone.	Same.	43
317	Shady Side-Otsego.	Otsego.	7, 10, '06	2, 73	16	26	Emb.	Local stone.	Sand	Local stone.	Same.	
318	Collinsville-Milford Center.	Otsego.	6, 30, '06	2, 03	14	24	2, 169	Local stone.	Sand	Local stone.	Same.	18
319	Schenewis-Maryland.	Otsego.	6, 20, '06	3, 66	16	22, 24, 32	4, 083	Local stone.	Sand	Local stone.	Same.	28
320	Valley Road-Maryland.	Onondaga.	8, 31, '06	1, 31	12	26	4, 484	Local stone.	Sand	Local stone.	Same.	
321	Peetskill-Salem Center, Sec. 3.	Westchester.	7, 20, '06	3, 88	14, 16	24, 26	2, 921	Local stone.	Sand	Local stone.	Same.	
322	Peetskill-Salem Center, Sec. 4.	Westchester.	7, 20, '06	2, 23	14, 16	24, 26	4, 588	Local stone.	Sand	Local stone.	Same.	
323	Genesee-Quandadigua, Sec. 3.	Ontario.	7, 10, '06	1, 60	16	32	2, 987	Limestone.	Sand	Limestone.	Same.	77
324	Lyon-Geneva.	Ontario.	7, 10, '06	1, 60	12	24-32	1, 983	Limestone.	Sand	Limestone.	Same.	3
325	Victor-Mendon, Sec. 1.	Ontario.	7, 5, '06	5, 20	12	24-32	2, 841	Lo or li.	Sand	Limestone.	Same.	17
326	Cayuga Heights.	Tompkins.	8, 30, '06	3, 17	12, 24, 26, 28	6, 151	Emb.					
328	Catskill-Turpentine, Sec. 2.	Tompkins.	8, 30, '06	1, 38	16	26	4, 891					
329	Georgetown.	Madison.	9, 18, '06	3, 20	12, 16	22, 26	3, 040					
340	Saratoga-Corinth.	Saratoga.	7, 6, '06	7, 25	12, 14	26	2, 565	Local stone.	Sand	Trap-rock.	Limestone.	
341	Stockport-Hudson.	Columbia.	7, 6, '06	2, 60	16	26-28	Emb.	Local stone.	Sand	Trap-rock.	Same.	23
342	Chatham-Chatham Center.	Columbia.	8, 28, '06	1, 12	16	24	7, 501	Gravel.	None.	Gravel.	None.	
343	Pawling-Patterson.	Dutchess.	7, 7, '06	2, 23	14	24-26	3, 928	Local stone.	Sand	Local stone.	Same.	6
344	Millerton-Northeast Center.	Dutchess.	7, 9, '06	1, 78	14	24-26	4, 284	Local stone.	Sand	Local stone.	Same.	23
348	Collamer.	Onondaga.	7, 9, '06	1, 90	16	26	Emb.	Limestone.	Sand	Limestone.	Same.	65
356	Erin-Horsesheds.	Chemung.	7, 7, '06	9, 22	16	24-32	2, 283	Limestone.	Sand	Limestone.	Same.	20
357	Grand Central Ave.	Chemung.	9, 13, '06	1, 57	16	28-32	2, 051	Limestone.	Sand	Trap-rock.	Limestone.	9
359	Frankfort-Union, Sec. 2.	Herkimer.	7, 10, '06	1, 96	16	26	2, 711	Local stone.	Sand	Trap-rock.	Same.	98
360	Poland-Gold Brook.	Herkimer.	7, 5, '06	0, 35	16	26	3, 006	Local stone.	Sand	Trap-rock.	Same.	39
361	Johnstown-Irises Hill, Sec. 1.	Fulton.	7, 5, '06	2, 22	16	26	4, 041	Local stone.	Sand	Local stone.	Same.	8
364	Frankton Hollow-Potter Hollow.	Albany.	7, 12, '06	3, 13	14	24-26	3, 304	Local stone.	Sand	Local stone.	Same.	20
365	Guilderland Center-Hilderland.	Albany.	7, 12, '06	1, 88	14	24	2, 623	Local stone.	Sand	Trap-rock.	Same.	39
366	New Scotland-Wool Hill.	Albany.	7, 11, '06	6, 88	12, 14	24	5, 102	Local stone.	Sand	Local stone.	Same.	33
367	Glenmont-Fetra Bush.	Albany.	7, 6, '06	6, 77	12, 12	22-24	2, 802	Local stone.	Sand	Limestone.	Same.	
369	Augusta Road, Oriskany Falls.	Oneida.	8, 29, '06	2, 99	14	22	Emb.					
370	Minetto.	Oneida.	9, 18, '06	0, 48	16	26	4, 479	Limestone.	Sand	Limestone.	Same.	3
371	Clinton Street, Sec. 1.	Erie.	7, 18, '06	5, 46	16	24-28	1, 683	Limestone.	Sand	Limestone.	Same.	
372	Clinton Street, Sec. 2.	Erie.	7, 18, '06	6, 14	16	24-28	2, 007	Limestone.	Sand	Limestone.	Same.	
373	Goodrich Road.	Erie.	7, 9, '06	8, 7	12, 16	16-32	3, 130	Limestone.	Sand	Limestone.	Same.	
374	Maine.	Broome.	7, 12, '06	3, 37	12, 12	20-26-28	2, 801					
375	Barber.	Broome.	7, 12, '06	0, 62	16	28	Emb.					
377	Cincinnati.	Cortland.	7, 10, '06	0, 43	16	26	Emb.	Limestone.	Sand	Limestone.	Same.	97
378	McGrawville.	Cortland.	7, 10, '06	2, 92	12, 16	24, 26	Emb.	Fieldstone.	Same.	Limestone.	Same.	14
379	Harford.	Cortland.	9, 19, '06	0, 91	12	26	1, 648					

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1906 — (Concluded).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards of excavation per mile.	MATERIALS.					Per cent completed.	TOTAL COST COMPLETED.	
								Bottom.		Top.		Whole.		Per mile.	
								(Usually 4 inches thick after rolling.)	Kind of screenings or sand as filler.	(Usually 2 inches thick after rolling.)	Kind of screenings or sand as filler.				
								Kind of crushed rock.	Kind of screenings or sand as filler.	Kind of crushed rock.	Kind of screenings or sand as filler.				
383	Owasco	Cayuga	7, 10, '06	2.19	16	24-26	Emb.	Limestone	Sand	Limestone	Same	42			
386	Five Cor-Kuckville, Sec. 1	Orleans	8, 31, '06	3.47	12	28-32	1,336	Lo fld.	Sand	Lo fld.	Same				
387	Five Cor-Kuckville, Sec. 2	Orleans	8, 31, '06	5.80	12, 16	16-32	2,138	Lo fld.	Sand	Lo fld.	Same				
388	Kendall's Corners	Orleans	7, 9, '06	3.43	12, 16	21-32	2,244	Lo fld.	Sand	Local gran.	Same				
417	Glens Falls-Lake George	Warren	7, 10, '06	7.56	12, 16	24-26	2,543	Local stone	Sand	Trap-rock	Same	28			
418	Lake George-Bolton Landing	Warren	7, 10, '06	9.74	16	26	3,387	Local stone	Sand	Local stone	Same				
420	Vestal	Broome	7, 12, '06	3.69	12, 16	28	3,008								
425	Adams-Watertown, Sec. 2	Jefferson	7, 3, '06	3.16	12, 16	24, 26	3,513	Limestone	Sand	Limestone	Same	30			
427	Watertown-Carthage, Sec. 2	Jefferson	7, 7, '06	5.47	12, 16	22, 24, 26	6,357								
428	Thompson	Onondaga	7, 9, '06	2.83	12	24	3,021	Fieldstone	Sand	Limestone	Same	76			
430	Jordan Valley, Sec. 1	Onondaga	7, 20, '06	1.72	12	24	2,600								
431	Skaneateles-Spafford	Onondaga	7, 20, '06	2.50	12	22-24	4,428	Local stone	Sand	Local stone	Same				
432	Rhinbeck-Hyde Park	Dutchess	8, 31, '06	3.26	16	28-30	6,009	Local stone	Sand	Local stone	Same				
433	Chazy-Chazy Ldg-Ober's Cor'n.	Clinton	9, 1, '06	4.60	14	26	2,223	Local stone	Sand	Trap-rock	Same	4			
434	Arundel-Hay View	Nassau	7, 10, '06	1.69	12	24, 26	2,754	Local stone	Sand	Trap-rock	Same	4			
435	South Glenwood-Meeting House	Nassau	9, 1, '06	1.94	12, 16	24, 26	2,460	Local stone	Sand	Trap-rock	Same				
436	Jericho Turnpike-Plainview	Nassau	9, 1, '06	6.98	12	20-28	2,460	Local stone	Sand	Trap-rock	Same				
438	Augusta Rd.-Lowell & Spencer	Oneida	8, 20, '06	7.10	14, 16	24, 26	1,746	Limestone	Sand	Limestone	Same	1			
441	Saratoga-Glens Falls, Sec. 4 & 5	Saratoga	8, 31, '06	8.32	14	24-26	2,550	Local stone	Sand	Local stone	Same				
446	Cortland-Groton, Sec. 1	Cortland	7, 10, '06	1.35	16	28	1,926	Fieldstone	Sand	Limestone	Same				
452	Cicero-South Bay	Onondaga	7, 9, '06	3.53	16	26	1,845								
453	Poughkeepsie-Hyde Park	Dutchess	7, 10, '06	4.00	16, 23, 28, 32		2,403	Local stone	Sand	Local stone	Same				
454	Ithaca	Tompkins	8, 20, '06	3.66	16, 24, 26, 28		3,083	Fieldstone	Sand	Limestone	Same	1			

REPORT
OF THE
DIVISION ENGINEER
OF THE
EASTERN DIVISION

For the Fiscal Year Ending September 30, 1906.

EASTERN DIVISION.

STATE OF NEW YORK,
DEPARTMENT OF STATE ENGINEER AND SURVEYOR,
EASTERN DIVISION.

ALBANY, *October 1, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor:*

Sir.— I have the honor of submitting herewith my annual report as Division Engineer of the Eastern Division of your Department for the fiscal year ending September 30, 1906.

The chief work of this Division has consisted in performing the necessary engineering work in connection with the present canal system and making surveys, plans and supervising construction of the new Barge canal; also making surveys, plans and supervising improvement of highways under chapter 115, Laws of 1898.

For canal purposes the Eastern Division comprises that part of the canal system of the State extending from the Hudson river at Albany to the east line of Oneida county, and from the junction of the Erie and Champlain canals, about a mile north of Watervliet, to the south end of Lake Champlain, covering a total of 188.36 miles of navigable waters.

For highway improvement purposes there are included in the Eastern Division the counties of Albany, Clinton, Columbia, Delaware, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Nassau, Orange, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington and Westchester, with a total highway mileage of 31,538 miles.

Co-operation has been extended and assistance given to the Department of Public Works in making surveys, plans and estimates whenever it has been requested. Surveys have been made and testimony given on behalf of the State in the Court of Claims in suits brought against the State for damage resulting from leaks and breaks in the canal.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

For the purpose of Barge canal work the Eastern Division has been divided into the following residencies:

Erie canal, Residency No. 1. From the Congress street bridge crossing the Hudson river at Troy to the west end of the lower Mohawk aqueduct, including that portion of the Hudson river which is common to the main line of the canal and of the Champlain canal. H. P. Willis, Resident Engineer in charge, office at Waterford.

Erie canal, Residency No. 2. From the west end of the lower Mohawk aqueduct to the head of old lock No. 27, situated about three-fourths of a mile west of Cranes Village, Montgomery county. H. P. Willis, Resident Engineer in charge, office at Schenectady.

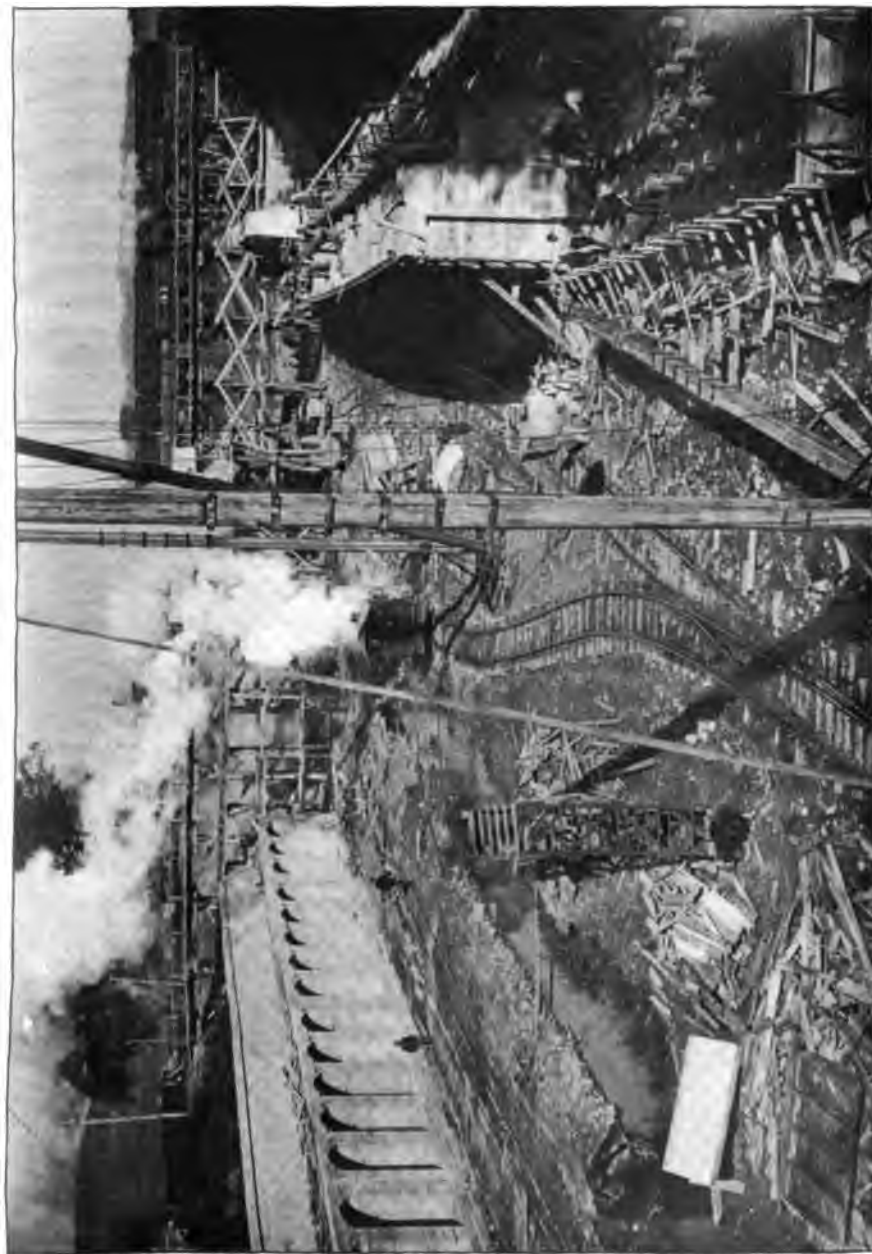
Erie canal, Residency No. 3. From the head of old lock No. 27 to the head of old lock No. 34 at Mindenville, Montgomery county. H. W. DeGraff, Resident Engineer in charge, office at Fonda.

Erie canal, Residency No. 4. From the head of lock No. 34 to the easterly line of Oneida county, which is also the east line of the city of Utica. S. M. Savage, Resident Engineer in charge, office at Little Falls.

Champlain canal, Residency No. 1. From the junction of the Barge canal and Champlain canal, in the Hudson river east of Waterford, to the foot of old lock No. 10, near Northumberland dam, Washington county. John R. Kaley, Resident Engineer in charge, office at Fort Edward.

Champlain canal, Residency No. 2. From the foot of lock No. 10, near Northumberland dam, Washington county, to the highway crossing the present Champlain canal at Dunham's Basin, Washington county, including the Glens Falls feeder, dam and pond above. John R. Kaley, Resident Engineer in charge, office at Fort Edward.

Champlain canal, Residency No. 3. From the highway crossing the present Champlain canal at Dunham's Basin, Washington county, to Lake Champlain. John R. Kaley, Resident Engineer in charge, office at Fort Edward.



BARGE CANAL, CONTRACT NO. 2.

View at Waterford, showing approach to lock, with chambered retaining walls. Two railroad trains are shown crossing the canal; one on a temporary trestle, delivering material to pockets for concrete-making; the other, a passenger train, on the main line of the Delaware and Hudson railroad.

The work carried on in the several residencies has consisted in making surveys, borings, soundings, maps, contract drawings, and construction work. The several resident engineers report as follows:

"ERIE CANAL, RESIDENCY No. 1.

"This residency extends from Congress street bridge at Troy to the lower Mohawk aqueduct at Crescent, a distance of 8.5 miles.

"The work on this residency has been entirely construction work.

"*Contract No. 2.* This contract was awarded April 3, 1905, to the Ferguson Contracting Co.

"At the beginning of the fiscal year, although the contract had been awarded for four months, the only work which had been done was 40 per cent of the clearing and 16 $\frac{3}{4}$ per cent of the excavation. The work has progressed during the year, and the following table gives the amount of work done on the most important items of the contract for the fiscal year and the total to date:

CONTRACT No. 2.

Item of work.	Preliminary estimate.	Work done during year.	Total work to date.	Per cent work during year.	Per cent work to date.
Clearing.....	40.5 acres	23.4 acres	36.6 acres	50	90
Grubbing.....	1,200 cu. yds.	65 cu. yds.	65 cu. yds.	5.5	5.5
All excavation.....	585,000 cu. yds.	237,300 cu. yds.	237,300 cu. yds.	35	51
Sheeting and bracing.....	50,000 ft. B. M.	13,176 ft. B. M.	13,176 ft. B. M.	26	26
Foundation piles, 15 ft. and 20 ft. long.....	2,130 piles	1,485 piles	1,485 piles	70	70
25 ft. long.....	100 piles	3 piles	3 piles	3	3
Second-class concrete.....	71,000 cu. yds.	7,522 cu. yds.	7,522 cu. yds.	11	11
Iron casings.....	233,000 lbs.	5,138 lbs.	5,138 lbs.	2	2
Iron casings (machined).....	58,000 lbs.	6,675 lbs.	6,675 lbs.	12	12
Additional building and draining, lock No. 3.....	Lump sum	$\frac{1}{2}$	$\frac{1}{2}$	50	50

Total of all work done during year = 14 $\frac{1}{2}$ per cent of estimated cost.
Total of all work done to date = 18 $\frac{1}{2}$ per cent of estimated cost.

"From the above table it will be seen that satisfactory progress has not been made on this contract. With the exception of the item of excavation, during this time none of the work has been advanced as rapidly, nor has the percentage of work been done, that was called for by the contract. The concrete plant, which has been in operation during the past season, was of much too small

capacity for work of this magnitude. The contractors, however, recognize this fact, and it is their intention to abandon the plant and put in one of a much greater capacity. There are other reasons, however, why the work has not progressed as rapidly as it should, the principal ones being the delay in getting buildings removed from the right of way and the delay incidental to the change in the plans which make the locks 45 feet wide instead of 28 feet wide.

"*Contract No. 11.* This contract was awarded May 21, 1906, to the Fort Orange Construction Co. Work preliminary to construction began on this contract the latter part of June, but it was not until the early part of August that actual construction began. The work is now well organized, and the following table gives the amount of work done on the most important items of the contract to the end of the fiscal year:

CONTRACT NO. 11.

Item of work.	Preliminary estimate.	Work done to Oct. 1, 1906.	Per cent work done.
Clearing	Lump sum	1-5	20
Grubbing	15,000 cu. yds.	5,250 cu. yds.	35
All excavation	800,000 cu. yds.	7,250 cu. yds.	1
Forming embankment			
First class	115,000 cu. yds.	3,500 cu. yds.	3
Second class	275,000 cu. yds.	3,300 cu. yds.	1
Concrete	165,000 cu. yds.	0 cu. yds.	0

Work of all classes done during year = 0.28 per cent of estimated cost.

"The section under contract and covered by contracts Nos. 2 and 11 is that between the Hudson river at Waterford and the Mohawk river at Dam No. 2. The only remaining sections on Residency No. 1 are those from the Troy dam to Waterford and from dam No. 2 to Crescent. On the former section no surveys have been made as per instructions to this effect. For the section between dam No. 2 and Crescent, the necessary surveys and borings have been made, maps plotted, and plans prepared. The work on this section is included under contract No. 14.

"All of the necessary surveys for the appropriation of land on this section have been made. During the coming winter it is proposed to plot up the notes and prepare the appropriation maps.

" ERIE CANAL, RESIDENCY NO. 2.

" This residency extends from the lower Mohawk aqueduct at Crescent to old lock No. 27 at Cranes Village, a distance of 27.0 miles.

" During the year all of the necessary office work, surveys and borings to complete all of the construction work on the residency have been completed. This includes the work necessary to canalize the Mohawk river from Crescent to Cranes Village; the construction of lock No. 7 and dam No. 3 at Vischer's Ferry, lock No. 8 and dam No. 4 at Scotia, lock No. 9 and dam No. 5 at Rotterdam, and lock No. 10 and dam No. 6 at Cranes Village. With the exception of the removal of the aqueducts at Crescent and Rexford Flats and the removal of the dam and adjacent excavation at Rexford Flats, plans for all of the construction above mentioned have been prepared and are included under contracts Nos. 8, 14 and 20. The maps and drawings for the latter contract were prepared in the residency office, while only the maps for contracts Nos. 8 and 14 were prepared there.

"All of the surveys have been made and maps prepared for the appropriation of land necessary for the execution of contract No. 8. Other appropriation surveys have been made of all the land which is to be taken, between Crescent and Dunsbach Ferry and at Vischer's Ferry. The only work of this nature which remains to be done is the surveys of the land between Dunsbach Ferry and Rexford Flats, which is to be appropriated. When this latter work is finished, all survey work on the residency will be completed.

" The only portion of the work on this residency which is under construction is that embraced in contract No. 8, and includes the locks and dams at Scotia, Rotterdam and Cranes Village. This contract was awarded May 22, 1906, but up to date the contractors have done no actual construction. They are preparing to begin excavation at lock No. 10 and have laid tracks to the spoil bank."

Respectfully submitted,

H. P. WILLIS,

Resident Engineer.

“ERIE CANAL, RESIDENCY No. 3.

“ This residency extends from old lock No. 27, Erie canal, to old lock No. 34 at Mindenville, a distance of 35.3 miles.

“ The base line has been run from Station 3424 ($1\frac{1}{2}$ miles west of Canajoharie) to Station 3929 + 89 at Mindenville, and all transit points monumented. A careful line of levels has been run over this line and frequent bench marks have been established.

“ Stadia surveys have been made covering the proposed location for dam No. 10 at Canajoharie and dam No. 11 at Fort Plain. These surveys are each about a mile in length and cover the topography between the N. Y. C. & H. R. R. R. and the W. S. R. R. A topographic survey was also made from St. Johnsville to Mindenville, and the Erie canal between these points was carefully cross-sectioned.

“ Soundings and cross-sections have been taken at intervals of 100 feet along the center line over the entire section. Between Auriesville and Yosts the proposed center line of the canal was run out on the ice and cross-sections were taken, using this line as a base line.

“ Wash-drill and rock-drill borings have been made for dam sites No. 8 at Tribes Hill, No. 9 at Yosts, No. 10 at Canajoharie, No. 11 at Fort Plain, and also at the first proposed location for lock No. 16 near St. Johnsville.

“ Drive-rod soundings for channel excavation have been made over the entire section (lock No. 27 to lock No. 34). Borings have also been made at the mouths of all stream entrances on the section.

“ Maps, profiles and cross-sections have been plotted between lock No. 27 and Fort Plain, and plans and estimate for contract No. 28, which includes all the dredging on section No. 3, have been started.”

Respectfully submitted,

H. W. DeGRAFF,

Resident Engineer.

“ERIE CANAL, RESIDENCY No. 4.

“ This residency extends from lock No. 34 at Mindenville to the Herkimer-Oneida county line, a distance of 27.8 miles.

"For construction purposes the work has been divided into five contracts, Nos. 18, 29, 30, 31 and 32.

"Contract No. 18 consists of lock No. 16 at Mindenville, 3.63 miles of land line section, and a guard-lock at Indian Castle.

"Contract No. 29 consists of lock No. 17 at Little Falls, 1.15 miles of land line through the city of Little Falls, and a guard-gate.

"Contract No. 30 consists of all the river work between Indian Castle and Little Falls, between Little Falls and Jacksonburg, and between Herkimer and Utica (Oneida county line).

"Contract No. 31 consists of lock No. 18 at Jacksonburg, 4.2 miles of land line, and a guard-lock at Herkimer (Mohawk St.).

"Contract No. 32 consists of dam No. 14 at Herkimer, dam No. 15 at Harbor, lock No. 19 at Harbor, and all the steel construction on Residency No. 4.

"The surveys forming the basis of contract estimates are practically completed for the residency.

"The borings, except for locations for locks Nos. 17 and 18, are also completed.

"The white paper plans, cross-section sheets, and profiles are nearly completed to that degree required for the making of contract tracings.

"More complete details are indicated by the following tabular statement:

SURVEYS AND PLANS.

	1904-1905, by Emile Low.	Sept. 30, 1905, reported.	Sept. 30, 1905, to Sept. 30, 1906.	Total to date of report.
Transit line.....	36 miles	45 miles	76 miles	157 miles
Levels (including cross-sections).....	41 miles	47 miles	115 miles	203 miles
Borings (penetration).....	627 feet	1,316 feet	14,184 feet	17,127 feet
Topography.....			2 sq. mi.	2 sq. mi.
White paper plan, 1 inch = 100 feet.....			26 miles	26 miles
Cross-sections.....			30 miles	30 miles
Contract tracings.....			11 miles	11 miles
Estimates				
Estimates, preliminary.....			26 miles	26 miles
Estimates, contract.....			11 miles	11 miles
Plans for structures.....			‡ completed	‡ completed

CONDITION OF CONTRACT PLANS, SEPTEMBER 30, 1906.

	Contract No. 18, 3.63 miles.	CONTRACT NO. 30.			Contract No. 29, 1.15 miles.	Contract No. 31, 4.2 miles.	Contract No. 32, lock 19, dams 14 and 15 and steel work.
		A 4.15 miles.	B 4.2 miles.	C 11.55 miles.			
General white paper plan from present surveys.....	C	C	C	C	C	C	C
Special plans for structures.....	C	C	C	C	C	C	C
Estimates preliminary to location.....	C	C	C	C	C	C	C
Estimates for contracts.....	C	C	C	C	0-10	0-10	..
Contract tracings.....	C	C	C	C	0-10	0-10	..
Contract plans.....	C	C	C	C	0-10	0-10	..
Contract cross-sections.....	C	C	C	C	0-10	0-10	..
Contract spoil banks.....	C	C	C	C	0-10	0-10	..
Contract special.....	C	C	C	C	0-10	0-10	..

C indicates complete.

Fraction indicates proportion completed.

Respectfully submitted,

S. M. SAVAGE,

Resident Engineer.

"CHAMPLAIN CANAL, RESIDENCIES NOS. 1, 2 AND 3.

"Residency No. 1.

("Waterford to lock No. 10 at Northumberland, length about 30 miles.)

"No work has been done on this residency during the fiscal year, except the reading of the river gages.

"The continuation of the preliminary survey work for the proposed Barge canal, which was started last year, will be again taken up about the first part of the month of October, 1906.

"Residency No. 2.

("From lock No. 10, Northumberland, to the highway at Dunham's Basin, length 13.75 miles.)

"CONSTRUCTION WORK.

"About 9½ miles of the proposed canal on this residency is now under contract, divided as follows:

" Contract No. 1 from Northumberland to Fort Miller, and from Crocker's reef to about one-half mile south of Fort Edward. Length of contract, 7.075 miles.

" Contract No. 3 from Fort Miller to Crocker's reef. Length, 2.164 miles.

" During the year the engineering forces on both contracts, Nos. 1 and 3, have been engaged in laying out, inspecting and directing the work done, and also in making measurements for and in preparing monthly estimates for payments to the contractors; also doing the necessary amount of office work in the way of making the required daily, weekly and monthly reports, concerning the work in progress.

" CONSTRUCTION WORK, CONTRACT NO. 1.

" This contract was awarded April 18, 1905, to the Empire Engineering Corporation.

" The prism excavation, started last year on " The Land Line " at Crocker's reef, was continued up to December, 1905, and then stopped for the winter. The excavation at that time was done by *wheeled scrapers, excavator and teams*. The material encountered was a wet and sticky clay.

" This excavation was resumed on April 26, 1906, by means of a steam shovel, and was carried on until July 7, 1906, when the steam shovel work was discontinued, as its progress was very unsatisfactory, due to the character of the material excavated.

" It has been arranged to take up this excavation again by means of a hydraulic dredge, which will begin work on the river end of " The Land Line," and deposit the material into scows, which will be carried to the " spoil " in the river channel on the upper side of the new dam at Crocker's reef.

" During the winter the contractors began to assemble their plant for the excavation of the river channel. The machinery for this work consisted of the following:

One rock-breaker.

Six scows.

Five locomotives.

Two tugs.

Two traveling cranes.

Two dipper dredges.

"The hulls for the dredges and for the rock-breaker were brought to the site of the work by way of the Champlain canal; the machinery was shipped by rail.

"In July, 1906, one dredge began work in the river channel at the upper end of the contract. The excavated material was deposited into pocket scows and then carried to an unloading dock, where it was raised by "Hulett" buckets attached to traveling cranes and deposited into dump cars, by which it was taken to the spoil banks on the west shore of the river by locomotive power.

"The second dredge began work in August, 1906, in the river channel, excavating approaches to the spoil-bank docks located on the banks of the river.

"The rock-breaker began work on July 20, 1906, on the northerly reef on this contract, located at Station 468.

"There are three rock reefs between Crocker's reef and the north end of the contract, as follows:

Station 361.

Station 424.

Station 460.

"The rock is mostly in vertical layers, and it was necessary to experiment somewhat with the machine, in order to understand how to work it to the best advantage, and also to remedy slight defects in its parts. Considerable trouble was experienced on account of low water, which made the operation of this machine difficult.

"But little of the rock broken up by the rock-breaker has yet been excavated. When the breaker began work the cut was not made deep enough to enable the dipper dredge to pick up the excavated material. Later the cut was made deeper and the material handled to better advantage.

"The concrete work on this contract has progressed as follows: The east spillway and its abutments of the Crocker's reef dam was completed during the latter part of August, 1906. The cofferdam for the west spillway in the west channel of the river was completed on September 7, 1906, and the foundation pit pumped out on September 12, 1906. The work on the west spillway is

well under way, and the entire structure, including abutments and core walls, will be completed about the middle of November, 1906.

" The following table gives the amount of work done on the most important items of the contract for the fiscal year and the total to date.

Item of Work.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
	<i>Cu. Yds.</i>	<i>Cu. Yds.</i>	<i>Cu. Yds.</i>		
Grubbing.....	2,400	328	1,028	13.6	42.7
All excavation.....	913,500	33,706	47,261	3.67	5.17
Forming embankment....	26,000	310	1,722	1.19	6.62
First-class concrete.....	1,000	669.9	669.9	67.	67.
Second-class concrete....	4,110	2,075.0	2,075.0	50.5	50.5
Total, for work of all classes done.....	\$605,008 40	\$39,040 00	\$47,210 00	6.4	7.8

" CONSTRUCTION WORK, CONTRACT NO. 3.

" This contract was awarded April 4, 1905, to Sundstrom & Stratton.

" The work on this contract has been progressing during the year, without delay.

" The grubbing is about completed, except in the vicinity of structures.

" The excavation for the canal prism (except for trimming) has been in progress without interruption during the year from the guard-gate at Crocker's reef southerly, about one-half mile; and from the Fort Miller lock northerly, about three-quarters of a mile of it is nearly completed; the balance is well under way.

" The excavation for the Fort Miller lock and its approaches is about three-quarters completed.

" Work has been started on the excavation for the abutments of but one bridge.

" The forming of embankment for the canal prism is nearly completed.

" The concrete work on the east wall of the lower approach of the Fort Miller lock has been started, and about 200 linear feet completed.

"The contractors are installing stone and sand bins and a concrete mixing plant at Fort Miller. It is about three-quarters completed, and will have a capacity of 300 cubic yards of concrete per day.

"The time for the completion of this contract was twenty-four months. Eighteen months have already passed, and computing on a cash basis only 34 per cent of the work is completed.

"The following table gives the amount of work done on the most important items of the contract for the fiscal year and the total to date.

Item of work.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
	<i>Cu. Yds.</i>	<i>Cu. Yds.</i>	<i>Cu. Yds.</i>		
Grubbing.....	8,460	4,056	6,969	48	82
All excavation.....	860,346	385,720	518,561	45	60
Forming embankment.....	113,400	39,239	64,216	35	57
Concrete (second-class).....	38,400	1,176	1,622	3	4
Total for work of all classes done.....	Bid \$705,113	\$177,910	\$241,360	25	34

"PRELIMINARY SURVEY WORK.

("From the north end of contract No. 1 to the highway at Dunham's Basin.)

"On this part of Residency No. 2, for a distance of about 4.5 miles, the preparatory work for the preliminary surveys has been completed, the contract drawings and estimates have been made for the work to be done under two contracts, and appropriation surveys have been made for thirty-three (33) parcels of land.

"Additional borings have also been made on the adopted center line through lock locations.

"In addition to the above mentioned work on the canal, a complete survey has been made of the Glens Falls feeder. The survey included running the base line, taking levels, stadia measurements and details of structures. This survey has been plotted on mounted egg shell paper, to the scale of 100 ft. to one inch."

*"Residency No. 3.**"PRELIMINARY SURVEY WORK.*

("From the highway at Dunham's Basin to Lake Champlain, at Whitehall, a distance of 19.8 miles.)

"The survey for the proposed Barge canal on this residency has been completed, and contract drawings have been prepared for the contract from about seven (7) miles south of Whitehall to the highway at Dunham's Basin. Contract drawings have also been prepared for the contract covering the work to be done between Lake Champlain at Whitehall, and the highway at Dunham's Basin.

"Additional borings have been made on the center lines through lock locations.

"About three (3) miles of center line for lock locations at Smith's Basin were located, and cross-sections taken from the same.

"Appropriation surveys have been made for seventy-nine (79) pieces of property from about 7 miles south of Whitehall to the highway at Dunham's Basin, and about two-thirds ($\frac{2}{3}$) of the appropriation maps have been completed between Whitehall and the highway at Dunham's Basin."

Respectfully submitted,

JOHN R. KALEY,

Resident Engineer.

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Under chapter 115, Laws of 1898, and chapter 468, Laws of 1906.)

There have been one hundred and four contracts for roads in force on the Eastern Division during the past year, having a total length of 446.8 miles, at an estimated cost of \$2,119,728.41.

CONTRACTS COMPLETED DURING THE YEAR
ENDING SEPTEMBER 30, 1906.

ADDITIONAL WORK ON PINES BRIDGE-YORKTOWN HEIGHTS ROAD,
No. 148-A, WESTCHESTER COUNTY, N. Y.

Length, 3.49 miles.

Engineer's preliminary estimate of total cost, including engineering, \$750.

Contract dated, October 5, 1905.

Work commenced, October, 1905.

Work completed, November, 1905.

Final account, \$635.

Contractor, John H. Kahrs.

Engineer in charge, C. H. Fosdick.

This work consisted of excavating earth and rock and placing a sand top course on Road No. 148.

NEWBURGH-CAMPBELL HALL ROAD, No. 153, ORANGE COUNTY,
N. Y.

Length, 13.38 miles.

Width of macadam, gravel or shale, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$94,438.

Contract dated, June 24, 1903.

Work commenced, August, 1903.

Work completed, January, 1906.

Final account, \$86,816.67.

Contractor, Board of Supervisors of Orange county.

Engineers in charge, F. M. Williams, H. E. Breed and E. G. Raynor.

Local gravel and crushed fieldstone were used to form the wearing surface.

Road No. 153 extends from the city of Newburgh, westerly through the villages of Little Britain and Burnside to Campbell Hall, where it joins the improved highway between Goshen and Montgomery, known as Road No. 65.

CHESTER-VAIL'S GATE ROAD, No. 154, ORANGE COUNTY, N. Y.

Length, 11.49 miles.

Width of gravel and shale, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$58,210.

Contract dated, June 24, 1903.

Work commenced, July, 1903.

Work completed, July, 1906.

Final account, \$51,837.20.

Contractor, Board of Supervisors of Orange county.

Engineers in charge, F. M. Williams, H. E. Breed and Lloyd Olmstead.

Local gravel and broken shale were used to form the wearing surface of this road.

Road No.154 commences at Road No. 42 at Vail's Gate and extends southwesterly through the village of Salisbury to the east corporate limits of Washingtonville, thence from the west corporate limits of said village through Blooming Grove and Craigsville to the village line of Chester.

ALBANY-SCHENECTADY ROAD, No. 176, ALBANY COUNTY, N. Y.

Length, 2.31 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$23,000.

Contract dated, July 26, 1904.

Work commenced, August, 1904.

Work completed, December, 1905.

Final account, \$21,447.

Contractor, Robert Shafer.

Engineer in charge, C. H. Fosdick.

Mohawk valley limestone was used to form the macadam in both courses of this road. Sand was used as a filler for bottom course, and limestone screenings were used as a binder for the top course.

Road No. 176 extends from the city line of Albany, westerly along the main highway to Schenectady, a distance of 2.31 miles, to the Wolf road.

SCHOHARIE (SECTIONS 1 AND 2) ROAD, No. 177, ALBANY
COUNTY, N. Y.

Length, 5 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$46,980.

Contract dated, June 9, 1904.

Work commenced, July, 1904.

Work completed, June, 1906.

Final account, \$42,721.55.

Contractor, Albany Material & Construction Company.

Engineers in charge, Theodore A. Hendrickson in 1904; R. E. Phillips, O. J. Dempster and J. C. Patrick in 1905; and J. C. Patrick in 1906.

Section No. 1 of the road extends from the village line of Altamont, easterly to the West Shore R. R. at Guilderland Center.

Section No. 2 extends from the easterly town line of Knox, westerly to the Gallup schoolhouse. On the old highway there were grades ranging from 15 to 20 per cent, and to avoid these a new location was acquired for about 3,100 feet, with grades not exceeding 6 per cent.

The bottom course of this road was built of local fieldstone, with sand and screenings for filler, and the top course was formed of South Bethlehem limestone with screenings for binder.

DELAWARE TURNPIKE (SECTION 3) ROAD, No. 178, ALBANY
COUNTY, N. Y.

Length, 7.38 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$96,700.

Contract dated, June 8, 1904.

Work commenced, June, 1904.

Work completed, August, 1906.

Final account, \$85,886.28.

Contractor, Jeremiah T. Finch.

Engineers in charge, E. A. Lamb and Wm. R. Trumbull.

Road No. 178 is a continuation of Roads Nos. 7 and 41, and extends through the village of Clarksville to the bridge over Oniskathau creek.

Schoharie limestone was used from Station 0 to Station 80 for both courses; sand was used as a filler for bottom course, and Schoharie limestone screenings for top course. From Station 80 local limestone was used for both courses with sand as a filler for bottom course, and local limestone screenings as a binder for the top course.

This road has a number of exceedingly heavy grades on a very treacherous clay soil, and was practically impassable in the spring and fall. To keep within an 8 per cent maximum grade, it was necessary to make heavy cuts, and also to acquire new locations near Union Church and Clarksville.

SCHENECTADY-ALBANY ROAD, No. 179, SCHENECTADY COUNTY,
N. Y.

Length, 2.35 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$31,200.

Contract dated, June 17, 1904.

Work commenced, April, 1905.

Work completed, June, 1906.

Final account, \$28,510.67.

Contractor, Buckley Construction Company.

Engineer in charge, Wm. E. Petty.

Road No. 179 extends from the city line of Schenectady, easterly along the main highway to Albany, a distance of 2.35 miles, to the Albany county line.

Mohawk valley limestone was used to form the macadam in both courses of this road. Sand was used as a filler for bottom course, and limestone screenings were used as a binder for the top course.

BEAVER DAM ROAD, No. 192, ALBANY COUNTY, N. Y.

Length, 3.54 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$35,380.

Contract dated, June 9, 1904.

Work commenced, August, 1905.

Work completed, June, 1906.

Final account, \$35,867.04.

Contractor, Joseph Walker.

Engineers in charge, F. J. Mulvaney and M. W. Nelson.

Road No. 192 extends from the south line of the town of Knox southerly to the village of Berne, thence westerly to West Berne.

Local limestone was used to form the macadam in both courses of this road. Sand was used as a filler for the bottom course, and limestone screenings were used as a binder for the top course.

RIVER ROAD, No. 193, ALBANY COUNTY, N. Y.

Length, 8.13 miles.

Width of macadam, 12, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$90,350.

Contract dated, June 11, 1904.

Work commenced, July, 1904.

Work completed, October, 1905.

Final account, \$69,055.56.

Contractor, James Anderson.

Assigned to J. T. Finch.

Engineer in charge, L. L. Melius.

Road No. 193 extends from the Glenmont station on the West Shore R. R., southerly along the west bank of the Hudson river to the intersection with the Selkirk-Becker's Corners Road, thence westerly through the village of Selkirk to the Stone road at Becker's Corners.

Clinton Point limestone was used for bottom course with sand for filler. Trap rock was used for top course with limestone screenings for binder.

ADDITIONAL WORK ON RIVER ROAD, No. 193-A, ALBANY COUNTY, N. Y.

Length, 8.13 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$5,080.

Contract dated, May 29, 1906.

Work commenced, July, 1906.

Work completed, July, 1906.

Final account, \$5,898.60.

Contractor, Joseph Walker.

Engineer in charge, Ludlow L. Melius.

This work consisted in excavating earth and placing and spreading $\frac{3}{4}$ -inch trap rock 2 inches thick in the center on Road No. 193.

EAST NASSAU ROAD, No. 196, RENSSELAER COUNTY, N. Y.

Length, 3.02 miles.

Width of gravel, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$18,121.

Contract dated, June 23, 1904.

Work commenced, July, 1904.

Work completed, February, 1906.

Final account, \$14,252.30.

Contractor, Thomas H. Karr.

Engineers in charge, F. P. Larmon in 1904; R. Russell during 1905.

Road No. 196 is a continuation of improved road No. 55 on the north and extends from the village of Hoag's Corners southerly to East Nassau. This road, together with State Roads Nos. 55, 194 and 77 already built, and Nos. 284 and 288 now being built, affords a continuous improved road from the city line of Troy to the village of East Nassau passing through Wynantskill, Glasshouse, Averill Park, Hoag's Corners and Sand Lake to East Nassau.

Local gravel was used to form the wearing surface of this road.

DELAWARE TURNPIKE (SECTION 4) ROAD, No. 198, ALBANY COUNTY, N. Y.

Length, 6.527 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$71,100.

Contract dated, June 9, 1904.

Work commenced, June, 1904.

Work completed, September, 1906.

Final account, \$66,967.87.

Contractor, Michael F. Dollard.

Engineers in charge, E. A. Lamb and J. C. Patrick in 1905, and L. L. Melius in 1906.

Road No. 198 is an extension of Roads Nos. 178, 41 and 7, and for nearly the entire length leaves the line of the direct road to Rensselaerville, most of the road being a new location. The ascent of the Helderbergs is made around the north side of Wolf hill, nothing steeper than five per cent grades being used, with but few descending grades. This detour avoids the very steep grades and deep gullies of the present highway, which, at one place, rises five hundred feet in about three-quarters of a mile.

Local limestone was used to form the macadam in both courses of this road. Sand was used as a filler for bottom course, and local limestone screenings as a binder for top course.

DELAWARE TURNPIKE (SECTION 5) ROAD, No. 199, ALBANY COUNTY, N. Y.

Length, 7.871 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$66,750.

Contract dated, June 9, 1904.

Work commenced, September, 1904.

Work completed, January, 1906.

Final account, \$61,070.47.

Contractor, Joseph Walker.

Engineers in charge, E. A. Lamb and H. E. Fraleigh in 1904; E. A. Lamb and F. J. Mulvaney in 1905.

Road No. 199 is an extension of Roads Nos. 198, 178, 41 and 7. From Van Leuvan's Corners to Rensselaerville the line follows the highway known as the old plank road, entering Rensselaerville by the only road having easy grades, thus avoiding a high ridge with steep grades.

Local stone was used to form the macadam in both courses of this road. Sand was used as a filler for bottom course, and local stone screenings as a binder for top course.

BOSTON AND ALBANY ROAD, No. 202, RENSSELAER COUNTY, N. Y.

Length, 5.42 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$54,506.

Contract dated, June 23, 1904.

Work commenced, July, 1904.

Work completed, October, 1905.

Final account, \$51,264.27.

Contractor, The Scofield Company.

Engineers in charge, Perry Filkin and F. B. Morss.

Road No. 202 extends from the easterly boundary of the city of Rensselaer through East Greenbush to the junction with the Post road near Schodack. This road is a part of the main road from Albany to Boston.

Local stone was used for bottom course with sand filler; for the top course trap rock was used, with local stone screenings and sand as a binder.

**ADDITIONAL WORK ON BOSTON AND ALBANY ROAD, No. 202-A,
RENSSELAER COUNTY, N. Y.**

Length, 5.42 miles.

Engineer's preliminary estimate of total cost, including engineering, \$616.

Contract dated, April 30, 1906.

Work commenced, May, 1906.

Work completed, July, 1906.

Final account, \$600.

Contractor, Town of East Greenbush.

Engineer in charge, L. L. Melius.

This work consisted of scraping the surface and placing $\frac{3}{4}$ -inch trap rock on surface.

SOUTH ROAD, No. 223, DUTCHESS COUNTY, N. Y.

Length, 3.904 miles.

Width of macadam, 16 feet; thickness of macadam, 8 inches.

Engineer's preliminary estimate of total cost, including engineering, \$49,550.

Contract dated, July 20, 1904.

Work commenced, October, 1904.

Work completed, September, 1906.

Final account, \$44,301.79.

Contractor, James E. Martin.

Engineer in charge, G. A. Ensign.

Road No. 223 extends from the city line of Poughkeepsie, southerly to Casper Creek.

Local limestone with sand filler was used for bottom course, which is 6 inches thick (with sand filler); for the top course, 2 inches thick, trap rock was used, with limestone screenings as a binder.

CONTRACTS PENDING SEPTEMBER 30, 1906.**TURK HILL-PUTNAM COUNTY LINE ROAD, No. 151, WESTCHESTER COUNTY, N. Y.**

Length, 5.99 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$70,650.

Contract dated, June 19, 1903.

Work commenced, April, 1905.

Work completed, 86 per cent.

Contractors, Ganung and Hoyt.

Engineer in charge, Perry Filkin.

Road No. 151, when finished, will afford a continuous macadam road along the east side of Westchester county for a distance of about 31 miles, commencing at the corporate lines of White Plains and extending northerly through the villages of Valhalla, Kensico Armonk, New Castle, Bedford, Cross River, Salem Center, North Salem to the Putnam county line.

Local granitic rock was used in forming both courses of the macadam on this road. Sand and granitic rock screenings were used as a binder.

WOODBURY-CENTRAL VALLEY ROAD, No. 157, ORANGE COUNTY,
N. Y.

Length, 3.48 miles.

Width of gravel, 18 feet.

Engineer's preliminary estimate of total cost, including engineering, \$24,330.

Contract dated, July 20, 1906.

Work commenced, July, 1906.

Work completed, 32 per cent.

Contractor, Orange County Road Construction Co.

Engineer in charge, R. D. Hayes.

Road No. 157 connects Woodbury and Central Valley. This road is being constructed with gravel surface.

NORTHAMPTON ROAD, No. 158, MONTGOMERY COUNTY, N. Y.

Length, 0.7 mile.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$7,665.

Contract dated, September 1, 1906.

Work not started.

Contractor, Alonzo Schaupp.

Road No. 158 extends from the north line of the farm of Stephen Sanford and Sons to the Fulton county line. The contract calls for the use of local stone on all three courses of this road.

SLATE HILL-UNIONVILLE ROAD, No. 160, ORANGE COUNTY,
N. Y.

Length, 8.38 miles.

Width of gravel, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$52,000.

Contract dated, June 18, 1904.

Work commenced, August, 1904.

Work completed, 99 per cent.

Contractor, The Orange County Road Construction Co.

Engineers in charge, F. M. Williams and M. W. Williams.

Road No. 160 joins Road No. 159 on the northeast at Slate Hill and extends to the village of Unionville on the southwest. Local gravel was used to form the wearing surface.

NEWBURGH-SHAWANGUNK ROAD, NO. 161, ORANGE COUNTY,
N. Y.

Length, 8.61 miles.

Width of shale and macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$54,120.

Contract dated, June 18, 1904.

Work commenced, August, 1904.

Work completed, 78 per cent.

Contractor, The Orange County Road Construction Co.

Engineers in charge, F. M. Williams and H. E. Poole.

Road No. 161 extends from the city line of Newburgh, northwesterly to the Ulster county line, connecting with the proposed system of improved highways through Ulster county.

Local stone was used from Station 0 + 0 to Station 191 + 0, and from Station 191 + 0 to Station 454 + 78 the wearing surface was changed from gravel (which was originally contemplated) to local stone and shale.

WYNANTSKILL-WEST SAND LAKE ROAD, NO. 195, RENSSELAER
COUNTY, N. Y.

Length, 4.01 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$39,400.

Contract dated, June 23, 1904.

Work commenced, October, 1904.

Work completed, 91 per cent.

Contractor, Thomas H. Karr.

Engineer in charge, Ralph Russell.

Road No. 195 extends from the village of West Sand Lake, northerly to State Road No. 77, in the village of Wynantskill. This road when completed, together with Road No. 77, will afford a continuous macadam road from the city line of Troy to West Sand Lake.

Local stone was used to form the macadam in both courses of this road. Sand was used as a filler for bottom course, and local stone screenings were used as a binder for the top course.

TROY-POESTENKILL ROAD, No. 201, RENSSELAER COUNTY, N. Y.

Length, 3.60 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$33,450.

Contract dated, June 13, 1904.

Work commenced, June, 1905.

Work completed, 81 per cent.

Contractor, William H. Masterson.

Engineer in charge, E. W. Sylvester.

Road No. 201 extends from the old toll gate on the Troy-Sand Lake road, easterly to Hunt's hotel in the village of Poestenkill. This is a continuation of Road No. 77 which starts at the city line of Troy.

Local stone was used to form the macadam in both courses of this road. Sand was used as a filler for the bottom course, and local stone screenings were used as a binder for the top course.

BRUNSWICK TURNPIKE ROAD, No. 227, RENSSELAER COUNTY,
N. Y.

Length, 3.1 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 19 per cent.

Contractor, Corliss Construction Company.

Engineers in charge, J. T. Brady and H. P. Condon.

Road No. 227 connects the village of Eagle Mills with the city of Troy. Local stone is being used to form the bottom course while trap rock is being used to form the middle and top courses with local stone screenings as a binder.

SAUGERTIES-KINGSTON ROAD, No. 228, ULSTER COUNTY, N. Y.

Length, 5.66 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$55,700.

Contract dated, June 29, 1906.

Work commenced, August, 1906.

Work completed, 18 per cent.

Contractor, John E. Consaulus.

Engineer in charge, H. C. Titus.

Road No. 228 runs southerly from Saugerties to Chas. Hub-scher's hotel in the towns of Saugerties and Ulster. Local stone is being used for bottom and top courses, including local stone screenings for binder.

KINGSTON-ELLENVILLE (SECTION 1) ROAD, No. 230, ULSTER COUNTY, N. Y.

Length, 8.27 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$88,200.

Contract dated, July 11, 1906.

Work not started.

Contractor, Joseph Walker.

Road No. 230 extends from the Rochester town line through the village of Stone Ridge to the Hurley town line in the town of Marbletown. The contract calls for the use of local stone to form the bottom and top courses, with local stone screenings for binder.

POST (SECTION 1) ROAD, No. 231, ULSTER COUNTY, N. Y.

Length, 7.08 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$71,100.

Contract dated, July 7, 1906.

Work commenced, August, 1906.

Work completed, 6 per cent.

Contractors, McNamee and Rice.

Engineer in charge, A. C. Perkins.

Road No. 231 extends from the town line of Esopus to the town line of Marlborough in the town of Lloyd. Local stone is being used to form the bottom and top courses with local stone screenings for binder.

OLD STATE ROAD, No. 232, ESSEX COUNTY, N. Y.

Length, 2.64 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 45 per cent.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Engineer in charge, F. J. Mulvaney.

Road No. 232 extends southerly from the village of Keeseville to the highway near the property of A. H. Mace in the town of Chesterfield. Local stone is being used for all three courses of this road.

FRANKFORT-EAST SCHUYLER ROAD, No. 233, HERKIMER COUNTY,
N. Y.

Length, 1.64 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$14,300.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 11 per cent.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Engineer in charge, O. J. Dempster.

Road No. 233 extends from the railroad freighthouse at Frankfort, westerly to the Bridenbecker creek cross-road in the town of Schuyler.

Local stone is being used for bottom course of this road with sand filler; trap rock is being used for middle and top courses with screenings for binder.

DELHI-MIDDLETOWN ROAD, No. 239, DELAWARE COUNTY, N. Y.

Length, 4.96 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$53,300.

Contract dated, August 30, 1906.

Work not started.

Contractor, Morris Kantrowitz.

Road No. 239 extends from State Road, No. 36, westerly to Margaretville in the town of Middletown. The contract calls for local stone to be used in bottom and top courses of this road.

COHOES-WATERFORD ROAD, No. 240, SARATOGA COUNTY, N. Y.

Length, 1 mile.

Width of paving, 35 feet.

Engineer's preliminary estimate of total cost, including engineering, \$24,432.41.

Contract dated, July 3, 1906.

Work commenced, August, 1906.

Work completed, 56 per cent.

Contractor, John W. Flynn.

Engineer in charge, Ralph Russell.

Road No. 240 extends from the Mohawk river bridge to town of Waterford. This road is to be vitrified brick pavement laid on 6-inch concrete foundation with a sand cushion, and a concrete gutter and curb on either side.

The United Traction Company operates a double track trolley line on this street and pays for 20 feet of pavement for the entire length.

SARATOGA-BALLSTON ROAD, No. 241, SARATOGA COUNTY, N. Y.

Length, 4.335 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$40,370.

Contract dated, July 13, 1906.

Work not started.

Contractor, Schenectady Contracting Co.

Road No. 241 connects the villages of Saratoga Springs and Ballston Spa. The contract calls for the use of local stone with sand filler for bottom course, and trap rock for middle and top courses, including screenings for binder.

SARATOGA-GLENS FALLS (SECTION 2) ROAD, No. 242, SARATOGA COUNTY, N. Y.

Length, 1.25 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$9,820.

Contract dated, July 13, 1906.

Work not started.

Contractor, Saratoga Trap Rock Co.

Road No. 242 extends from the east line of the town of Greenfield, northerly in the town of Wilton.

The contract calls for the use of local stone with sand filler for bottom course, and trap rock for middle and top courses, including screenings for binder.

MECHANICVILLE-STILLWATER ROAD, No. 243, SARATOGA COUNTY, N. Y.

Length, 1.84 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,300.

Contract dated, July 9, 1906.

Work commenced, September, 1906.

Work completed, 2 per cent.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Engineer in charge, Ralph Russell.

Road No. 243 connects the villages of Mechanicville and Stillwater. Local stone is being used for bottom course of this road. Trap rock is being used for middle and top courses with screenings for binder.

SARATOGA-SCHUYLerville ROAD, No. 244, SARATOGA COUNTY,
N. Y.

Length, 6.01 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$59,550.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 6 per cent.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Engineer in charge, Ralph Russell.

Road No. 244 extends from the village line of Schuylerville, westerly to the town line of Saratoga Springs.

Approved stone is being used to form the bottom course and trap rock for the middle and top courses, including stone screenings for binder.

GLOVERSVILLE-MECO-PHELPS ROAD, No. 246, FULTON COUNTY,
N. Y.

Length, 2.03 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,000.

Contract dated, July 12, 1906.

Work commenced, August, 1906.

Work completed, 6 per cent.

Contractor, Robert Shafer.

Engineer in charge, Lee Walker.

Road No. 246 consists of two sections. The Gloversville-Meco section connects Meco with the city of Gloversville. The Phelps

section connects Talmadge Parsons corners with the city of Gloversville.

Approved stone is being used for all three courses of this road, with stone screenings for binder for the middle and top courses.

JOHNSTOWN-KECK'S CENTER (SECTION 2) ROAD, No. 247, FULTON COUNTY, N. Y.

Length, 1.67 miles.

Width of macadam, 12 and 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$47,100.

Contract dated, July 9, 1906.

Work not started.

Contractor, Clinton Beckwith Engineering and Contracting Co.

Road No. 247 extends from State Road No. 110, westerly to the Old Fonda and Wheelerville plank road; and the Warren Creek-Red Schoolhouse section extends from the end of State Road No. 109, at Warren Creek, westerly, to the road forks near the Red schoolhouse.

The contract calls for the use of local stone for all three courses of this road.

GLOVERSVILLE-BROADALBIN ROAD, No. 248, FULTON COUNTY, N. Y.

Length, 2.02 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$22,300.

Contract dated, September 1, 1906.

Work not started.

Contractor, Schenectady Contracting Co.

Road No. 248 extends from the Mayfield road at Dennies Crossing, easterly to the F. J. & G. R. R. crossing. The contract calls for the use of local stone for all three courses of this road.

OLD PLANK ROAD, No. 249, FULTON COUNTY, N. Y.

Length, 3.14 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$28,000.

Contract dated, July 6, 1906.

Work commenced, August, 1906.

Work completed, 24 per cent.

Contractor, The Buckley Construction Company.

Engineer in charge, John B. Wright.

Road No. 249 extends from the Montgomery county line, northerly to the town line of Broadalbin in the town of Perth. Local stone is being used for all three courses of this road.

PLATTSBURG-KEESEVILLE (SECTION 3) ROAD, No. 258, CLINTON COUNTY, N. Y.

Length, 5.44 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$56,700.

Contract dated, July 9, 1906.

Work not started.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Road No. 258 is a continuation of State Road, No. 137, and extends southerly from the village of Peru to the village of Keeseville. The contract calls for the use of local stone for all three courses of this road.

PLATTSBURG-MOOERS (SECTION 2) ROAD, No. 259, CLINTON COUNTY, N. Y.

Length, 7.34 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$75,170.

Contract dated, July 6, 1906.

Work commenced, August, 1906.

Work completed, 10 per cent.

Contractor, The Buckley Construction Company.

Engineer in charge, Frank L. Bisbee.

Road No. 259 extends from the city of Plattsburg, northerly through East Beckmantown to the southern end of State Road,

No. 138. Local stone is being used for the bottom course of this road, and limestone is being used for the top course with screenings for binder.

PLATTSBURG-MOOERS (SECTION 3) ROAD, No. 260, CLINTON COUNTY, N. Y.

Length, 4.31 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$43,660.

Contract dated, August 1, 1906.

Work commenced, September, 1906.

Work completed, 1 per cent.

Contractor, The Buckley Construction Company.

Engineer in charge, H. J. Langlois.

Road No. 260 extends from the northerly end of State Road, No. 138, to the village of Mooers. Local stone is being used for bottom and top courses of this road.

PEEKSKILL-SALEM CENTRE (SECTION 1) ROAD, No. 261, WEST-CHESTER COUNTY, N. Y.

Length, 5.86 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$50,150.

Contract dated, July 6, 1906.

Work not started.

Contractor, The Scofield Company.

Road No. 261 extends from State Road, No. 149, at the north end of Amawalk reservoir through Somers Centre and Somers to the Croton river. The contract calls for the use of local stone for all three courses of this road.

PEEKSKILL-SALEM CENTRE (SECTION 2) ROAD, No. 262, WEST-CHESTER COUNTY, N. Y.

Length, 4.66 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$41,250.

Contract dated, July 6, 1906.

Work commenced, August, 1906.

Work completed, 13 per cent.

Contractor, The Scofield Company.

Engineers in charge, Perry Filkin and John T. O'Hora.

Road No. 262 extends from the Croton river, easterly through Purdy, around the north side of Titicus reservoir and through Salem Centre, connecting with State Road, No. 151, at the Titicus river crossing. Local stone is being used for all three courses of this road.

BIRCH HILL ROAD, No. 270, NASSAU COUNTY, N. Y.

Length, 1.16 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$14,950.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 45 per cent.

Contractors, Andrews Brothers.

Engineer in charge, James L. Chapman.

Road No. 270 is a continuation of State Road, No. 435, at Lattington and extends southeasterly to the highway near Birch hill. Trap rock is being used for all three courses of this road.

LAKE PLEASANT-SPECULATOR ROAD, No. 277, HAMILTON COUNTY, N. Y.

Length, 3.44 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$33,900.

Contract dated, July 12, 1906.

Work commenced, August, 1906.

Work completed, 2 per cent.

Contractor, Robert Shafer.

Engineers in charge, Carl Ahles and Harry W. Peck.

Road No. 277 extends from the Lake Pleasant inn, northeasterly

to the highway intersection in Speculator. Local stone is being used for all three courses of this road.

GREENVILLE-SLATE HILL ROAD, No. 282, ORANGE COUNTY, N. Y.

Length, 7.13 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$65,900.

Contract dated, August 30, 1906.

Work not started.

Contractors, Degraff and Hogeboom.

Road No. 282 connects the villages of Greenville and Slate Hill. The contract calls for the use of local stone for all three courses of this road.

GREENVILLE-PORT JERVIS ROAD, No. 283, ORANGE COUNTY, N. Y.

Length, 5.11 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$72,000.

Contract dated, September 4, 1906.

Work not started.

Contractor, The Orange County Road Construction Co.

Road No. 283 connects the villages of Greenville and Port Jervis. The contract calls for the use of local stone for all three courses of this road.

AVERILL PARK-CROOKED LAKE ROAD, No. 284, RENSSELAER COUNTY, N. Y.

Length, 3.61 miles.

Width of macadam, 14, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,440.

Contract dated, July 2, 1906.

Work commenced, August, 1906.

Work completed, 6 per cent.

Contractor, Martin Murray.

Engineers in charge, James T. Brady and C. F. Crowley.

Road No. 284 is a continuation of State Road, No. 194, in Averill Park and extends southerly through the villages of Sand Lake and Glasshouse to the Nassau town line. Local stone is being used for all three courses of this road.

NASSAU-BRAINARD ROAD, No. 285, RENSSELAER COUNTY, N. Y.

Length, 3.65 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$34,900.

Contract dated, July 7, 1906.

Work commenced, August, 1906.

Work completed, 12 per cent.

Contractor, Thomas H. Karr.

Engineer in charge, F. B. Morss.

Road No. 285 extends from the village of Nassau, easterly for a distance of 3.65 miles. Local stone is being used for all three courses of this road.

RENSSELAER-BEST ROAD, No. 287, RENSSELAER COUNTY, N. Y.

Length, 4.75 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$43,750.

Contract dated, August 30, 1906.

Work not started.

Contractor, Morris Kantrowitz.

Road No. 287 extends from the city line of Rensselaer, southeasterly through De Freestville and Best to the town line of Sand Lake. The contract calls for the use of local stone for all three courses of this road.

TROY-SAND LAKE (SECTION 2) ROAD, No. 288, RENSSELAER COUNTY, N. Y.

Length, 3.72 miles.

Width of gravel, 18 feet.

Engineer's preliminary estimate of total cost, including engineering, \$20,800.

Contract dated, July 3, 1906.

Work commenced, July, 1906.

Work completed, 39 per cent.

Contractor, John H. Gordon.

Engineers in charge, J. T. Brady and H. S. Mattimore.

Road No. 288 is a continuation of State Road, No. 194, and extends northerly to State Road, No. 201. Gravel is being used for the wearing surface of this road.

AMSTERDAM-HAGAMAN ROAD, No. 298, MONTGOMERY COUNTY,
N. Y.

Length, 2.20 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$19,400.

Contract dated, July 9, 1906.

Work not started.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Road No. 298 connects the village of Hagaman with the city of Amsterdam. The contract calls for the use of local stone for bottom and top courses of this road.

SAULWATER'S CORNERS-YOUNG'S CORNERS ROAD, No. 299, MONT-
GOMERY COUNTY, N. Y.

Length, 2.77 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$29,100.

Contract dated, July 11, 1906.

Work not started.

Contractor, Joseph Walker.

Road No. 299 extends from State Road, No. 32, southwesterly to the corner near the property of James A. Young. The contract calls for the use of local stone for bottom and top courses of this road.

DE GRAFF'S CORNERS-SHERBURNE'S CORNERS ROAD, No. 300,
MONTGOMERY COUNTY, N. Y.

Length, 1.13 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$10,200.

Contract dated, July 11, 1906.

Work commenced, August, 1906.

Work completed, 39 per cent.

Contractor, Joseph Walker.

Engineer in charge, C. R. De Graff.

Road No. 300 extends from State Road, No. 96, near the property of Chas. De Graff, westerly to the corner near the property of John Sherburne, in the town of Florida. Local stone is being used for the two courses of this road.

MINAVILLE-SCOTCH BUSH ROAD, No. 301, MONTGOMERY COUNTY,
N. Y.

Length, 2.34 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$20,900.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 15 per cent.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Engineer in charge, C. R. De Graff.

Road No. 301 extends from State Road, No. 96, at Minaville, southeasterly to the schoolhouse property in Scotch Bush. Local stone is being used for the two courses of this road.

FONDA-BERRYVILLE ROAD, No. 302, MONTGOMERY COUNTY,
N. Y.

Length, 2 miles.

Width of macadam, 12 and 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$16,300.

Contract dated, July 9, 1906.

Work commenced, July, 1906.

Work completed, 20 per cent.

Contractor, D. I. Snell & Co.

Engineer in charge, H. L. Michael.

Road No. 302 connects the villages of Fonda and Berryville. Local stone is being used for bottom course of this road, and trap rock or hard gneiss for middle and top courses.

KINGSTON-ELLENVILLE (SECTION 2) ROAD, No. 305, ULSTER COUNTY, N. Y.

Length, 7.25 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$71,725.

Contract dated, July 3, 1906.

Work commenced, September, 1906.

Work completed, 1 per cent.

Contractor, Town of Rochester.

Engineer in charge, A. C. Perkins.

Road No. 305 extends from the town line of Wawarsing, northeasterly to the town line of Marbletown. Local stone is being used for the two courses of this road.

MIDDLETOWN-CUDDEBACKVILLE (SECTION 1) ROAD, No. 312, ORANGE COUNTY, N. Y.

Length, 4.396 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$42,100.

Contract dated, September 4, 1906.

Work not started.

Contractor, The Orange County Road Construction Co.

Road No. 312 (Section 1) extends from the city line of Middletown, westerly to Station 259+35.3 near Pierson's crossing in the towns of Wallkill and Mount Hope. The contract calls for the use of local stone for all three courses of this road.

GILBERTSVILLE-MT. UPTON ROAD, No. 314, OTSEGO COUNTY,
N. Y.

Length, 4.37 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$46,900.

Contract dated, June 30, 1906.

Work not started.

Contractor, S. B. Van Wagonen.

Road No. 314 extends from the village of Gilbertsville, southwesterly to the Unadilla river bridge at Mt. Upton in the town of Butternuts. The contract calls for the use of local stone for bottom and top courses of this road.

MORRIS-GILBERTSVILLE (SECTION 1) ROAD, No. 315, OTSEGO
COUNTY, N. Y.

Length, 3.537 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$32,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 8 per cent.

Contractor, The Clinton Beckwith Engineering & Contracting Co.

Engineer in charge, J. C. Patrick.

Road No. 315 (Section 1) extends from the village line of Morris, southeasterly to the town line of Butternuts. Local stone is being used for all three courses of this road.

COLLIERSVILLE-EMMONS ROAD, No. 316, OTSEGO COUNTY, N. Y.

Length, 1.26 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,100.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 42 per cent.

Contractors, Siver and Gould.

Engineer in charge, J. C. Patrick.

Road No. 316 extends from the town line of Milford, southwesterly to State Road, No. 162, at Emmons. Local stone is being used for all three courses of this road.

SHADY SIDE-OTEGO ROAD, No. 317, OTSEGO COUNTY, N. Y.

Length, 2.73 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$26,200.

Contract dated, July 10, 1906.

Work not started.

Contractors, Siver and Gould.

Road No. 317 extends from the corners at Shady Side southwesterly to the town line of Otego. The contract calls for the use of local stone for all three courses of this road.

COLLIERSVILLE-MILFORD CENTER ROAD, No. 318, OTSEGO COUNTY, N. Y.

Length, 2.03 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$20,700.

Contract dated, June 30, 1906.

Work commenced, August, 1906.

Work completed, 18 per cent.

Contractor, S. B. Van Wagonen.

Engineer in charge, J. C. Patrick.

Road No. 318 extends from the highway intersection at Colliersville, northerly to the bridge near the property of Melvin Seegar. Local stone is being used for the two courses of this road.

SCHENEVUS-MARYLAND ROAD, No. 319, OTSEGO COUNTY, N. Y.

Length, 3.66 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$41,300.

Contract dated, June 30, 1906.

Work commenced, July, 1906.

Work completed, 38 per cent.

Contractor, S. B. Van Wagonen.

Engineer in charge, J. C. Patrick.

Road No. 319 extends from the village of Schenevus, westerly through Chaseville and Maryland to the Maryland cemetery. Local stone is being used for the two courses of this road.

PEEKSKILL-SALEM CENTER (SECTION 3) ROAD, No. 331, WEST-CHESTER COUNTY, N. Y.

Length, 3.88 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$47,800.

Contract dated, July 20, 1906.

Work not started.

Contractor, Orange County Road Construction Co.

Road No. 331 extends from the village of Peekskill, easterly to the foot of the hill near the property of E. Tice in the towns of Cortland and Yorktown. The contract calls for the use of local stone for all three courses of this road.

PEEKSKILL-SALEM CENTER (SECTION 4) ROAD, No. 332, WEST-CHESTER CO., N. Y.

Length, 3.23 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$39,650.

Contract dated, July 20, 1906.

Work not started.

Contractor, Orange County Road Construction Co.

Road No. 332 is a continuation of State Road, No. 331, from the foot of the hill near the property of E. Tice, easterly through the village of Yorktown to State Road, No. 149, near the property of C. Whitney in the town of Yorktown. The contract calls for the use of local stone for all three courses of this road.

SARATOGA-CORINTH ROAD, No. 340, SARATOGA COUNTY, N. Y.

Length, 7.25 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$63,500.

Contract dated, July 6, 1906.

Work not started.

Contractor, Buckley Construction Co.

Road No. 340 extends from the north town line of Saratoga Springs through the villages of Greenfield Center and North Greenfield to the Corinth town line in the town of Greenfield.

The contract calls for the use of local stone for bottom course of this road; trap rock for middle and top courses, with limestone screenings for binder.

STOCKPORT-HUDSON ROAD, No. 341, COLUMBIA COUNTY, N. Y.

Length, 2.60 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,150.

Contract dated, July 6, 1906.

Work commenced, July, 1906.

Work completed, 23 per cent.

Contractor, John W. Polcaro.

Engineers in charge, R. J. Harding and H. K. Bishop.

Road No. 341 extends from the city line of Hudson, northerly to the southerly line of the town of Stockport. Local stone is being used for bottom and middle courses of this road, and trap rock for top course with screenings for binder.

CHATHAM-CHATHAM CENTER ROAD, No. 342, COLUMBIA COUNTY,
N. Y.

Length, 1.12 miles.

Width of gravel, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$8,700.

Contract dated, August 28, 1906.

Work not started.

Contractor, John W. Polcaro.

Road No. 342 extends from the residence of Daniel Angel, northerly to the north end of Sutherland's hill in the town of Chatham. The contract calls for the use of gravel in the construction of this road.

PAWLING-PATTERSON ROAD, No. 343, DUTCHESS COUNTY, N. Y.

Length, 2.23 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$24,350.

Contract dated, July 7, 1906.

Work commenced, September, 1906.

Work completed, 6 per cent.

Contractor, The General Construction Company.

Engineer in charge, E. J. Howe.

Road No. 343 extends from the Putnam county line, northerly to the village line of Pawling. Local stone is being used for the two courses of this road.

MILLERTON-NORTH EAST CENTER ROAD, No. 344, DUTCHESS COUNTY, N. Y.

Length, 1.78 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$19,950.

Contract dated, July 9, 1906.

Work commenced, September, 1906.

Work completed, 23 per cent.

Contractor, The Lane Construction Corporation.

Engineer in charge, Alfred L. Simmons.

Road No. 344 extends from the village line of Millerton, southeasterly to the Poughkeepsie turnpike at North East Center. Approved local stone is being used for all three courses of this road.

FRANKFORT-UTICA (SECTION 2) ROAD, No. 359, HERKIMER
COUNTY, N. Y.

Length, 1.89 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$18,700.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 9 per cent.

Contractor, Charles R. Lewis.

Engineer in charge, O. J. Dempster.

Road No. 359 extends from a point 1.11 miles west of the village line of Frankfort to a point 3 miles west of Frankfort. Approved local stone with sand filler is being used for bottom course of this road, and trap rock, granite or gneiss for middle and top courses, including binder.

POLAND-COLD BROOK ROAD, No. 360, HERKIMER COUNTY, N. Y.

Length, 0.35 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$4,150.

Contract dated, July 2, 1906.

Work commenced, August, 1906.

Work completed, 98 per cent.

Contractor, Alonzo Schaupp.

Engineer in charge, O. J. Dempster.

Road No. 360 extends from the village line of Poland, northeasterly to the village line of Cold Brook. Approved stone with sand filler is being used for bottom course of this road, and trap rock, granite or gneiss for middle and top courses including binder.

JOHNSTOWN-TRIBES HILL (SECTION 1) ROAD, No. 361, FULTON
COUNTY, N. Y.

Length, 2.22 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$24,000.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 39 per cent.

Contractor, Ulysses G. Stockwell.

Engineers in charge, H. C. Wells and R. J. Murray.

Road No. 361 extends from the city line of Johnstown on East State street easterly to the Montgomery county line. Local stone is being used for all three courses of this road.

PRESTON HOLLOW-POTTER HOLLOW ROAD, No. 364, ALBANY COUNTY, N. Y.

Length, 3.13 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$27,400.

Contract dated, July 12, 1906.

Work commenced, September, 1906.

Work completed, 8 per cent.

Contractor, Robert Shafer.

Engineers in charge, Ludlow L. Melius and George A. Flynn.

Road No. 364 extends from the Cheese hill road in Preston hollow, southwesterly through Cooksburg to the highway intersection in Potter hollow. Approved local stone is being used for all three courses of this road.

GUILDERLAND CENTER-GUILDERLAND ROAD, No. 365, ALBANY COUNTY, N. Y.

Length, 1.89 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$17,990.

Contract dated, July 3, 1906.

Work commenced, July, 1906.

Work completed, 30 per cent.

Contractor, James H. Malcolm.

Engineers in charge, Ludlow L. Melius and R. N. Barrett.

Road No. 365 extends from State Road, No. 177, at Guilderland Center, easterly to the Western turnpike near Guilderland.

Local stone with sand filler is being used for the bottom course of this road, and trap rock for middle and top courses with screenings for binder.

NEW SCOTLAND-WOLF HILL ROAD, No. 366, ALBANY COUNTY,
N. Y.

Length, 6.85 miles.

Width of macadam, 12 and 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$88,900.

Contract dated, July 11, 1906.

Work commenced, July, 1906.

Work completed, 39 per cent.

Contractor, Joseph Walker.

Engineers in charge, Ludlow L. Melius and Mark W. Nelson.

Road No. 366 extends from State Road, No. 124, at New Scotland, southwesterly through New Salem to State Road, No. 198, at Wolf hill. Local stone is being used for the two courses of this road.

GLENMONT-FEURA BUSH ROAD, No. 367, ALBANY COUNTY, N. Y.

Length, 6.77 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$62,750.

Contract dated, July 6, 1906.

Work commenced, July, 1906.

Work completed, 33 per cent.

Contractor, The Buckley Construction Company.

Engineers in charge, Ludlow L. Melius and Wm. R. Trumbull.

Road No. 367 extends from State Road, No. 193, at Glenmont, southeasterly through Bethlehem Center to the highway intersection near the property of A. J. Wiltsie in Feura Bush. Local stone with sand filler is being used for bottom course of this road, and limestone for top course with screenings for binder.

GLENS FALLS-LAKE GEORGE ROAD, No. 417, WARREN COUNTY,
N. Y.

Length, 7.56 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$84,700.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 28 per cent.

Contractors, Casey and Murray.

Engineer in charge, Orson C. Richards.

Road No. 417 extends from the corporation line of the village of Glens Falls, northwesterly and northerly to the southerly corporation line of the village of Lake George. Local stone is being used for bottom course of this road, with sand for filler; trap rock for middle and top courses with screenings for binder.

LAKE GEORGE-BOLTON LANDING ROAD, No. 418, WARREN
COUNTY, N. Y.

Length, 9.74 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$108,875.

Contract dated, July 10, 1906.

Work not started.

Contractors, Casey and Murray.

Road No. 418 extends from the corporation line of the village of Lake George, northerly through the village of Bolton Landing to the bridge over Finkle brook. The contract calls for the use of local stone for all three courses of this road.

RHINEBECK-HYDE PARK ROAD, No. 432, DUTCHESS COUNTY,
N. Y.

Length, 3.26 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,725.

Contract dated, August 31, 1906.

Work not started.

Contractors, Lawlor and Haines.

Road No. 432 extends from the village line of Rhinebeck, southerly to the Hyde Park town line. The contract calls for the use of local stone for all three courses of this road.

CHAZY-CHAZY LANDING-OBER'S CORNERS ROAD, No. 433, CLINTON COUNTY, N. Y.

Length, 4.60 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$38,925.

Contract dated, September 1, 1906.

Work not started.

Contractor, Buckley Construction Company.

Road No. 433 extends from the D. & H. R. R. in the village of Chazy, southeasterly to the road leading to the dock in the village of Chazy Landing, and from State Road, No. 138, at Ober's Corners easterly through Sciota to the road leading to Mooers. The contract calls for the use of local stone for all three courses of this road.

ARRANDALE-BAY VIEW ROAD, No. 434, NASSAU COUNTY, N. Y.

Length, 1.69 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,800.

Contract dated, July 10, 1906.

Work commenced, September, 1906.

Work completed, 4 per cent.

Contractors, Andrews Brothers.

Engineer in charge, James L. Chapman.

Road No. 434 extends from the Middle Neck macadam road at Great Neck village, westerly and northerly to the Wharf road. Approved stone is being used for bottom course of this road; trap rock for middle and top courses, with screenings for binder.

SOUTH GLENWOOD-MEETING HOUSE ROAD, No. 435, NASSAU
COUNTY, N. Y.

Length, 1.94 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,000.

Contract dated, September 1, 1906.

Work commenced, September, 1906.

Work completed, 4 per cent.

Contractors, Peace Brothers.

Engineer in charge, James L. Chapman.

Road No. 435 extends from the Glen Cove back road, southwesterly to Hempstead Harbor, and from the Glen Cove-Oyster Bay macadam road northerly to the Glen Cove-Locust Valley macadam road, including both forks north of the residence of Townsend D. Cocks.

Local stone with sand filler is being used for bottom course of this road, and trap rock for middle and top courses with screenings for binder.

JERICO TURNPIKE-PLAINVIEW ROAD, No. 436, NASSAU COUNTY,
N. Y.

Length, 6.98 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$80,950.

Contract dated, September 1, 1906.

Work not started.

Contractor, Jeremiah T. Finch.

Road No. 436 extends from the macadam road at Jericho, northeasterly to the Suffolk county line, and from the Woodbury-Hicks-ville macadam road, southeasterly to the Farmingdale-Plainview macadam road. The contract calls for the use of approved stone for bottom course of this road, and trap rock for middle and top courses.

SARATOGA-GLENS FALLS (SECTIONS 4 AND 5) ROAD, No. 441,
SARATOGA COUNTY, N. Y.

Length, 8.32 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$74,700.

Contract dated, August 31, 1906.

Work not started.

Contractor, The Clinton Beckwith Engineering and Contracting Co.

Road No. 441 extends from State Road, No. 242, northerly through the village of Wilton to State Road, No. 58, at the town line of Moreau and from the village line of South Glens Falls, southwesterly to State Road, No. 58. The contract calls for the use of local stone for the two courses of this road.

POUGHKEEPSIE-HYDE PARK ROAD, No. 453, DUTCHESS COUNTY,
N. Y.

Length, 4 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$52,450.

Contract dated, July 10, 1906.

Work not started.

Contractors, McNamee and Rice.

Road No. 453 extends from the Poughkeepsie-Hyde Park town line, northerly to the south line of the property of F. W. Vanderbilt in the village of Hyde Park. The contract calls for the use of local stone for bottom course of this road, and trap rock for middle and top courses.

LITTLE FALLS-EAST CREEK ROAD, No. 456, HERKIMER COUNTY,
N. Y.

Length, 5.39 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$61,500.

Contract dated, July 19, 1906.

Work commenced, September, 1906.

Work completed, 2 per cent.

Contractor, Ulysses G. Stockwell.

Engineer in charge, O. J. Dempster.

Road No. 456 extends from the city line of Little Falls, easterly along the north side of the Mohawk river to the Montgomery county line at East Creek. Trap rock is being used for bottom course of this road, and gneiss for middle and top courses.

LITTLE FALLS-HERKIMER ROAD, No 457, HERKIMER COUNTY,
N. Y.

Length, 5.32 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$65,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 7 per cent.

Contractor, Sylvester A. Seymour.

Engineer in charge, O. J. Dempster.

Road No. 457 extends from the city line of Little Falls, westerly along the northerly side of the Mohawk river to the village line of Herkimer. Local stone is being used for bottom course of this road; trap rock, granite or gneiss for middle and top courses.

HERKIMER-FRANKFORT ROAD, No. 458, HERKIMER COUNTY,
N. Y.

Length, 3.69 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$38,925.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 6 per cent.

Contractor, John H. Nelson & Co.

Engineer in charge, O. J. Dempster.

Road No. 458 extends from the corporation line of the village of Herkimer, westerly along the northerly side of the Mohawk river to the easterly end of State Road, No. 233. Local stone is

being used for bottom course of this road; trap rock, granite or gneiss for middle and top courses.

EAST SCHUYLER-DEERFIELD ROAD, No. 459, HERKIMER COUNTY,
N. Y.

Length, 5.53 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$62,300.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, 5 per cent.

Contractor, The Clinton Beckwith Engineering & Contracting Co.

Engineer in charge, O. J. Dempster.

Road No. 459 extends from the end of State Road, No. 233, northwesterly through the village of West Schuyler to the end of State Road, No. 3, at the Oneida county line. Local stone is being used for the bottom course of this road; trap rock, granite or gneiss for middle and top courses.

HERKIMER-MIDDLEVILLE ROAD, No. 460, HERKIMER COUNTY,
N. Y.

Length, 6.30 miles.

Width of macadam, 12, 14, 15 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$72,515.

Contract dated, July 10, 1906.

Work not started.

Contractor, John H. Nelson & Co.

Road No. 460 extends from the corporation line of the village of Herkimer, northerly along the West Canada creek to the corporation line of the village of Middleville. The contract calls for the use of local stone for all three courses of this road.

AUSABLE FORKS-CLINTONVILLE ROAD, No. 476, CLINTON
COUNTY, N. Y.

Length, 5.38 miles.

Width of macadam, 14 and 22 feet.

Engineer's preliminary estimate of total cost, including engineering, \$56,150.

Contract dated, August 31, 1906.

Work not started.

Contractor, The Clinton Beckwith Engineering & Contracting Co.

Road No. 476 extends from the bridge over Ausable river in Ausable Forks village in the town of Black Rock to the intersection of Fulton street in the village of Clintonville. The contract calls for the use of local stone for all three courses of this road.

NORTHEAST CENTER-SHARON STATION ROAD, No. 534,
DUTCHESS COUNTY, N. Y.

Length, 3.65 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,100.

Contract dated, July 9, 1906.

Work not started.

Contractor, The Lane Construction Corporation.

Road No. 534 extends from the end of State Road, No. 344, at Northeast Center, southerly to the town line of Amenia near Sharon Station. The contract calls for the use of local stone for the two courses of this road.

AMENIA-WASSAIC ROAD, No. 537, DUTCHESS COUNTY, N. Y.

Length, 4.83 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$45,500.

Work not started.

Contractor, General Construction Company.

Road No. 537 extends from the road leading to Sharon Station, southerly through the villages of Amenia and Wassaic to the road leading to South Amenia. The contract calls for the use of local stone for the two courses of this road.

CHATHAM-SPENCERTOWN ROAD, NO. 540, COLUMBIA COUNTY,
N. Y.

Length, 4.32 miles.

Width of gravel, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$23,500.

Contract dated, July 6, 1906.

Work commenced, September, 1906.

Work completed, 8 per cent.

Contractor, John W. Polcaro.

Engineers in charge, R. J. Harding and H. K. Bishop.

Road No. 540 extends from the corporation line of the village of Chatham, southeasterly toward the village of Spencertown to Station 163 near the property of T. F. Niles. Gravel is being used for the wearing surface of this road.

POUGHKEEPSIE-PLEASANT VALLEY ROAD, NO. 549, DUTCHESS
COUNTY, N. Y.

Length, 6.93 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$60,450.

Contract dated, July 5, 1906.

Work commenced, July, 1906.

Work completed, 4 per cent.

Contractor, James E. Martin.

Engineer in charge, N. A. Taylor.

Road No. 549 extends from the Poughkeepsie city line, northeasterly to Station 275 near the corporation line of the village of Pleasant Valley; and from the forks of the roads near the lands of Eliza Baker, southeasterly to the bridge over Wappinger creek. Local stone is being used for the two courses of this road.

VIOLET AVENUE-EAST PARK ROAD, NO. 550, DUTCHESS COUNTY,
N. Y.

Length, 1.99 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$18,100.

Contract dated, August 28, 1906.

Work not started.

Contractors, Hinman and Spraul.

Road No. 550 extends from the northerly end of State Road, No. 135, northerly to the road corners at East Park. The contract calls for the use of local stone for all three courses of this road.

FISHKILL-HUGHSONVILLE ROAD, No. 551, DUTCHESS COUNTY,
N. Y.

Length, 2.91 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$25,700.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 23 per cent.

Contractors, McNamee and Rice.

Engineer in charge, Charles T. Fisher.

Road No. 551 extends from the corporation line of the village of Fishkill, northerly to State Road, No. 222, at Wappinger town line. Local stone is being used for the two courses of this road.

BALDWIN PLACE-MAHOPAC ROAD, No. 569, PUTNAM COUNTY,
N. Y.

Length, 5.90 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$51,500.

Contract dated, July 11, 1906.

Work commenced, August, 1906.

Work completed, 10 per cent.

Contractor, Joseph Walker.

Engineers in charge, Perry Filkin and C. R. Allen, Jr.

Road No. 569 extends from the northerly end of State Road, No. 149, westerly, northerly and northeasterly through the village of Mahopac to the fork of the roads at the southwest corner of the West Branch reservoir. Local stone is being used for all three courses of this road.

SCHENECTADY-GUILDERLAND ROAD, No. 577, SCHENECTADY
COUNTY, N. Y.

Length, 7.10 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$58,200.

Contract dated, July 9, 1906.

Work commenced, July, 1906.

Work completed, 45 per cent.

Contractor, Jeremiah T. Finch.

Engineer in charge, William T. Petty.

Road No. 577 extends from the Schenectady city line at Guilderland avenue, southerly to the Albany county line and from the N. Y. C. railroad near the village of Carmen, southerly to the Albany county line, and from State Road, No. 163, southeasterly and then northeasterly to the Schenectady city line at the bridge over N. Y. C. railroad. Local stone is being used for the two courses of this road.

NEVIS-BLUE STORE ROAD, No. 589, COLUMBIA COUNTY, N. Y.

Length, 3.81 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$28,600.

Contract dated, September 1, 1906.

Work not started.

Contractor, Harry S. Williams.

Road No. 589 extends from State Road, No. 552, at the Dutchess county line, northerly through Nevis to the Roeliff Jansen Kill near the Blue Store. The contract calls for the use of local stone for the two courses of this road.

HIGHLAND LAKE-TOMPKINS COVE ROAD, No. 593, ROCKLAND
COUNTY, N. Y.

Length, 5.88 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$105,650.

Contract dated, September 13, 1906.

Work not started.

Contractor, County of Rockland.

Road No. 593 extends from the Orange county line at Highland Lake, southerly along the Dunderberg Mt. to Tompkins Cove. The contract calls for the use of local stone for all three courses of this road.

IMPROVEMENT OF PUBLIC HIGHWAYS.

Recapitulation of Work Done to September 30, 1906.

COUNTY.	Miles under contract during year ending Sept. 30, 1906.	Miles of plans and estimates completed prior to Sept. 30, 1905.	Miles of plans and estimates completed prior to Sept. 30, 1906.	Miles of plans and estimates completed during year ending Sept. 30, 1906.	Miles of surveys made during year ending Sept. 30, 1906.	Miles of contracts completed prior to Sept. 30, 1905.	Miles of contracts completed prior to Sept. 30, 1906.	Miles of contracts completed during year ending Sept. 30, 1906.
Albany.....	59.398	79.348	94.518	15.17	28.01	14.69	55.448	40.768
Clinton.....	27.07	56.25	56.25	.....	5.60	17.66	17.66	.....
Columbia.....	11.85	4.94	12.49	7.55	52.38	1.13	1.13	.....
Delaware.....	4.96	15.054	15.054	.....	.....	4.52	4.52	.....
Dutchess.....	35.484	21.931	42.571	20.64	50.60	6.76	10.643	3.883
Essex.....	.....	2.64	2.64	.....	33.65	.....	.....	.....
Fulton.....	14.08	50.25	50.25	.....	.....	8.59	8.59	.....
Greene.....	.....	5.62	5.62	.....	.....	.....	.....	.....
Hamilton.....	3.44	3.44	3.44	.....	21.90	.....	.....	.....
Herkimer.....	30.11	108.30	108.30	.....	14.74	2.29	2.29	.....
Montgomery.....	13.78	102.664	106.904	4.24	15.61	22.164	22.164	.....
Nassau.....	11.77	43.195	43.195	.....	.....	.....	.....	.....
Orange.....	61.976	212.223	212.223	.....	37.22	66.64	91.51	24.87
Otsego.....	17.587	21.137	21.137	.....	.....	3.55	3.55	.....
Putnam.....	5.90	30.456	39.686	9.23	0.47	.....	.....	.....
Rensselaer.....	34.88	102.90	107.99	5.09	2.39	24.40	32.84	8.44
Rockland.....	5.88	11.11	11.11	.....	19.05	6.73	6.73	.....
Saratoga.....	29.995	55.065	55.065	.....	20.71	12.60	12.60	.....
Schenectady.....	9.45	20.235	28.965	8.73	17.72	5.371	7.721	2.35
Suffolk.....	.....	1.91	1.91	.....	.....	.....	.....	.....
Sullivan.....	.....	11.32	11.32	.....	.....	.....	.....	.....
Ulster.....	28.26	151.185	151.185	.....	9.80	44.11	44.11	.....
Warren.....	17.30	17.30	17.30	.....	41.99	.....	.....	.....
Washington.....	8.77	8.77	8.77	.....	45.31	7.09	7.09	.....
Westchester.....	23.62	95.06	99.45	4.39	26.88	55.00	55.00	.....
Total.....	446.79	1,232.303	1,307.343	75.04	444.03	303.295	383.596	80.301

MAINTENANCE AND REPAIR OF IMPROVED PUBLIC HIGHWAYS.

Under chapter 468, Laws of 1906, amending the Higbie-Armstrong act, the maintenance and repair of improved public highways was placed in charge of the State Engineer, and an appropriation was made for this purpose. This work has been done under

direct charge of the Division Engineer. For a considerable portion of this work contracts were prepared, advertised and awarded to the lowest bidder, the balance being done by purchasing materials direct and performing the labor with State forces. A table of contracts, and expenditures under State force accounts is appended.

A statement of engineering expenses of the Division is hereto annexed.

Respectfully submitted,

C. W. TRUMBULL.

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS EMPLOYED IN THE EASTERN DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES, FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1906.

Ordinary Repairs to Canals — Erie Canal.

Chapter 699, Laws of 1905.

Name.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. W. Trumbull...	Division engineer.	\$3,600 per year	\$2,100 00		\$2,100 00
W. J. Valleau...	Financial clerk and auditor.	2,400 per year	500 00		500 00
Parkes D. Wendell	Estimate clerk...	5 00 per day	710 00	\$1 70	711 70
Wm. B. Strong...	Estimate clerk...	5 00 per day	126 00		126 00
Matie Kelly...	Stenographer...	83 33 per month	241 84		241 84
Andrew D. Sharpe.	Stenographer...	50 00 per month	50 00		50 00
S. J. Bennett...	Tracer...	75 00 per month	75 00		75 00
John A. O'Connor.	Assistant engineer	6 00 per day	270 00	13 60	283 60
R. S. Greenman...	Assistant engineer	6 00 per day	1,044 00	40	1,044 40
E. G. Raynor...	Assistant engineer	5 00 per day	150 00		150 00
W. G. Craig...	Leveler...	4 50 per day	433 50		433 50
H. J. Richardson.	Rodman...	4 00 per day	448 00	19 45	467 45
J. E. Myers...	Rodman...	3 50 per day	189 00		189 00
J. C. Duggan...	Laborer...	2 00 per day	54 00		54 00
L. L. Gowdy...	Laborer...	2 00 per day	140 00		140 00
B. R. Healey...	Laborer...	2 00 per day	104 00		104 00
H. MacFarlane...	Laborer...	2 00 per day	32 00		32 00
Thos. Rattoone...	Laborer...	2 00 per day	54 00		54 00
G. H. Shuffelt...	Laborer...	2 00 per day	54 00		54 00
Herbert Soules...	Laborer...	2 00 per day	108 00		108 00
<i>Incidental Expenses.</i>			\$6,883 14	\$35 15	\$6,918 29
Stationery and printing...				\$145 25	
Fuel and light...				109 62	
Postage...				114 78	
Telephone and telegraph...				322 76	
Miscellaneous...				394 35	
Total					1,086 76
					\$8,005 05

Ordinary Repairs to Canals — Champlain Canal.

Chapter 699, Laws of 1905.

Name.	Rank.	Rate of compensation.	Services.	Travel.	Total.
W. J. Valleau...	Financial clerk and auditor...	\$2,400 per year	\$400 00		\$400 00
Parkes D. Wendell	Estimate clerk...	5 00 per day	225 00		225 00
Wm. B. Strong...	Estimate clerk...	5 00 per day	63 00		63 00
Matie Kelly...	Stenographer...	83 33 per month	245 80		245 80
Andrew D. Sharpe.	Stenographer...	50 00 per month	50 00		50 00
R. S. Greenman...	Assistant engineer	6 00 per day	685 00	\$ 20	685 20
J. A. O'Connor...	Assistant engineer	6 00 per day	102 00	4 10	106 10
E. G. Raynor...	Assistant engineer	5 00 per day	75 00		75 00
W. G. Craig...	Assistant engineer	5 00 per day	146 00	3 18	149 18

Ordinary Repairs to Canals—Champlain Canal—(Continued).

Name.	Rank.	Rate of compensation.	Services	Travel.	Total.
H. J. Richardson...	Rodman.....	\$4 00 per day	\$124 00	.....	\$124 00
E. H. Wetsel.....	Foreman of public works.....	2 50 per day	62 50	.....	62 50
J. C. Duggan.....	Laborer.....	2 00 per day	50 00	.....	50 00
L. L. Gowdy.....	Laborer.....	2 00 per day	184 00	.....	184 00
H. MacFarlane.....	Laborer.....	2 00 per day	50 00	.....	50 00
V. B. Patterson.....	Laborer.....	2 00 per day	50 00	.....	50 00
G. H. Shufelt.....	Laborer.....	2 00 per day	50 00	.....	50 00
Herbert Soules.....	Laborer.....	2 00 per day	50 00	.....	50 00
			\$2,612 30	\$7 48	\$2,619 78
<i>Incidental Expenses.</i>					
Stationery and printing.....				\$102 50	
Fuel and light.....				133 43	
Postage.....				34 00	
Telephone and telegraph.....				452 31	
Miscellaneous.....				652 93	
					1,375 17
Total.....					\$3,994 95

Construction of Barge Canal—Head Office Account.

Chapter 147, Laws of 1903: Chapter 143, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Henry C. Allen.....	Special deputy state engineer.....	\$5,000 per year	\$4 999 92	\$582 02	\$5 581 94
Wm. B. Landreth.....	Special resident engineer.....	4,500 per year	4,500 00	103 38	4,603 38
Noble E. Whitford.....	Resident engineer.....	2,400 per year	2,400 00	10 33	2,410 33
H. D. Alexander.....	Resident engineer.....	2,400 per year	2,283 00	4 57	2,287 57
F. P. Williams.....	Resident engineer.....	2,400 per year	1,055 94	16 50	1,072 44
G. M. Bull.....	Resident engineer.....	2,400 per year	1,300 33	.....	1,300 33
Wm. R. Davis.....	Chief bridge designer.....	3,300 per year	2,600 48	47 35	2,647 83
J. G. Peck.....	Assistant chief bridge designer.....	2,500 per year	2,438 65	4 76	2,443 41
F. E. Blake.....	Mech. engineer and draftsman.....	150 per month	1,667 33	.....	1,667 33
E. A. Brainerd.....	Bridge designer.....	150 per month	1,744 07	.....	1,744 07
H. J. Scheuermann.....	Bridge designer.....	150 per month	1,628 39	.....	1,628 39
O. H. Stratton.....	Bridge designer.....	150 per month	1,508 41	.....	1,508 41
Lemuel Holmes.....	Bridge designer.....	150 per month	1,376 28	6 85	1,383 13
S. B. Knowlton.....	Bridge designer.....	125 per month	1,475 81	.....	1,475 81
G. M. Baune.....	Bridge designer.....	125 per month	.....	11 04	11 04
J. C. Green.....	Bridge designer.....	125 per month	322 58	.....	322 58
E. C. Olcott.....	Bridge draftsman.....	125 per month	467 06	.....	467 06
T. C. Brooks.....	Bridge draftsman.....	125 per month	1,340 48	.....	1,340 48
A. G. Hayden.....	Bridge draftsman.....	125 per month	1,377 99	.....	1,377 99
H. F. Kellogg.....	Bridge draftsman.....	125 per month	1,375 29	.....	1,375 29
H. N. Peck.....	Bridge draftsman.....	115 per month	1,146 02	.....	1,146 02
A. F. Frost.....	Bridge draftsman.....	110 per month	1,320 00	.....	1,320 00
R. M. Wheeler.....	Bridge draftsman.....	100 per month	160 65	.....	160 65
A. T. Clark.....	Engineering draftsman.....	4 00 per day	224 00	.....	224 00
E. G. Semon.....	Bridge draftsman.....	100 per month	1,073 03	.....	1,073 03
D. F. Adams.....	Junior bridge draftsman.....	75 per month	495 55	.....	495 55
E. E. Briggs.....	Junior bridge draftsman.....	75 per month	330 48	.....	330 48
Emil Kuichling.....	Expert engineer.....	.....	770 00	.....	770 00
Wm. L. Sibert.....	Expert on movable dams.....	.....	300 00	.....	300 00
D. A. Watt.....	Expert designer.....	3,300 per year	3,300 00	176 29	3,476 29
G. F. Stickney.....	Expert lock designer.....	3,000 per year	2,555 59	20 42	2,576 01
A. A. Conger.....	Expert lock designer.....	2,400 per year	1,271 40	59 84	1,331 24
Glenn D. Holmes.....	Expert on canal and water supply.....	2,700 per year	2,042 04	266 02	2,308 06
W. J. Valleau.....	Financial clerk and auditor.....	2,800 per year	1,000 00	99 20	1,099 20
W. B. Strong.....	Estimate clerk.....	5 00 per day	576 50	.....	576 50
Nellie Clark.....	Stenographer.....	83 33 per month	999 96	.....	999 96
Matie Kelly.....	Stenographer.....	83 33 per month	75 00	.....	75 00
Cleora Van Vleck.....	Stenographer.....	75 00 per month	825 00	.....	825 00
Jean Watt.....	Stenographer, temporary.....	2 00 per day	25 00	.....	25 00
J. C. Guffin.....	Clerk.....	100 per month	46 67	.....	46 67
J. E. Kirk.....	Messenger.....	75 00 per month	135 49	.....	135 49
Geo. L. Schillner.....	Engineering draftsman.....	5 00 per day	1,240 00	.....	1,240 00

Construction of Barge Canal—Head Office Account—(Cont'd).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Grace Andrews.....	Engineering draftsman.....	\$5 00 per day	\$1,350 00		\$1,350 00
R. J. Noach.....	Architectural draftsman.....	5 00 per day	45 00		45 00
W. H. Slingerland, Jr.....	Engineering draftsman.....	5 00 per day	1,160 00		1,160 00
J. K. Lloyd.....	Engineering draftsman.....	5 00 per day	115 00		115 00
Guy B. Skinner.....	Engineering draftsman.....	4 00 per day	12 00		12 00
D. W. H. Daley.....	Engineering draftsman.....	4 00 per day	116 00		116 00
Le Roy W. Clark.....	Engineering draftsman.....	4 00 per day	14 50		14 50
E. G. Blessing.....	Engineering draftsman.....	4 00 per day	144 00		144 00
R. R. Shearer.....	Architectural draftsman.....	100 per month	993 00		993 00
R. L. Hyett.....	Architectural draftsman.....	100 per month	233 55		233 55
L. R. Ellis.....	Engineering draftsman.....	4 00 per day	630 00		630 00
R. J. Lyon.....	Engineering draftsman.....	1 00 per day	738 50		738 50
W. J. Peard.....	Tracer.....	75 00 per month	683 24		683 24
E. C. Altenberg.....	Tracer.....	75 00 per month	537 50		537 50
T. Ainsworth.....	Tracer.....	75 00 per month	708 90		708 90
C. S. Allen.....	Tracer.....	75 00 per month	201 63		201 63
R. P. Campfield.....	Tracer.....	75 00 per month	553 00		553 00
J. H. McCormack.....	Tracer.....	75 00 per month	653 00		653 00
L. B. Wessell.....	Tracer.....	50 00 per month	21 67		21 67
J. A. Pritchard.....	Tracer.....	50 00 per month	13 23		13 23
P. H. Dater.....	First assistant engineer.....	7 00 per day	1,965 00	42 11	1,967 11
C. A. Poole.....	First assistant engineer.....	7 00 per day	2,017 00	815 30	2,832 30
E. J. Pickwick.....	First assistant engineer.....	7 00 per day	1,506 00	13 88	1,519 88
F. C. Davis.....	First assistant engineer.....	7 00 per day	1,845 55		1,845 55
Geo. F. Chiam.....	First assistant engineer.....	7 00 per day	1,859 84		1,859 84
L. C. Hubbard.....	First assistant engineer.....	7 00 per day	1,821 00	16 22	1,837 22
L. W. Hull.....	Assistant engineer.....	6 00 per day	1,098 88		1,098 88
J. W. Mau.....	Assistant engineer.....	6 00 per day	1,152 90		1,152 90
F. N. Sanders.....	Assistant engineer.....	6 00 per day	1,212 00		1,212 00
Clark Brown.....	Assistant engineer.....	6 00 per day	1,894 30		1,894 30
Robert E. Horton.....	Assistant engineer.....	6 00 per day	744 00	134 45	878 45
F. W. Harris.....	Assistant engineer.....	6 00 per day	162 00		162 00
W. S. Conlter.....	Assistant engineer.....	6 00 per day	600 00		600 00
J. W. Hughes.....	Assistant engineer.....	6 00 per day	412 00		412 00
Howard E. Smith.....	Assistant engineer.....	6 00 per day	96 00		96 00
A. D. Sanderson.....	Assistant engineer.....	6 00 per day	516 00	3 03	519 03
C. J. McDonough.....	Assistant engineer.....	6 00 per day	306 00		306 00
James Burdon.....	Assistant engineer.....	6 00 per day	1,710 13		1,710 13
W. H. Van Wie.....	Assistant engineer.....	6 00 per day	1,724 13	2 42	1,726 55
Wm. P. Crocker.....	Assistant engineer.....	6 00 per day	1,432 04		1,432 04
W. G. Wilder.....	Assistant engineer.....	6 00 per day	1,455 00	3 46	1,458 46
O. C. Richards.....	Assistant engineer.....	6 00 per day	965 00		965 00
G. G. Underhill.....	Assistant engineer.....	6 00 per day	1,421 00	7 73	1,428 73
C. H. Hoyt.....	Assistant engineer.....	6 00 per day	1,127 78		1,127 78
T. M. Rindley.....	Assistant engineer.....	6 00 per day	1,662 36	3 62	1,665 98
J. A. O'Connor.....	Assistant engineer.....	6 00 per day	228 00		228 00
Herbert Spencer.....	Assistant engineer.....	6 00 per day	630 00		630 00
P. E. Green.....	Assistant engineer.....	6 00 per day	654 00		654 00
F. M. Lamas.....	Assistant engineer.....	6 00 per day	858 00		858 00
O. F. Bellows.....	Assistant engineer.....	6 00 per day	936 00		936 00
E. A. Lamb.....	Assistant engineer.....	6 00 per day	321 00	29 34	350 34
B. W. Roskranz.....	Assistant engineer.....	6 00 per day	1,552 50		1,552 50
H. O. Schermerhorn.....	Assistant engineer.....	6 00 per day	1,710 21		1,710 21
Chas. Kihm.....	Assistant engineer.....	6 00 per day	721 00	2 70	723 70
L. W. Fish.....	Assistant engineer.....	6 00 per day	693 00		693 00
H. A. Weeks.....	Assistant engineer.....	6 00 per day	1,559 04		1,559 04
L. S. Hubbard.....	Assistant engineer.....	6 00 per day	1,668 52		1,668 52
C. R. Chase.....	Assistant engineer.....	6 00 per day	1,510 40		1,510 40
C. F. Fisher.....	Assistant engineer.....	6 00 per day	1,174 12		1,174 12
Geo. H. Penfield.....	Assistant engineer.....	6 00 per day	1,645 10		1,645 10
E. J. Doyle.....	Assistant engineer.....	5 00 per day	1,238 13		1,238 13
E. D. Hendricks.....	Assistant engineer.....	5 00 per day	240 00		240 00
R. E. Phillips.....	Assistant engineer.....	5 00 per day	360 00		360 00
Thos. F. Nichols.....	Assistant engineer.....	5 00 per day	115 00		115 00
E. F. Ayres.....	Assistant engineer.....	5 00 per day	480 00		480 00
G. E. Gilson.....	Assistant engineer.....	5 00 per day	550 00	7 98	557 98
F. J. Wilbur.....	Assistant engineer.....	5 00 per day	555 00		555 00
F. C. Ashby.....	Assistant engineer.....	5 00 per day	1,245 00	3 45	1,248 45
Jon. P. Burns.....	Assistant engineer.....	5 00 per day	865 32		865 32
J. P. Newton.....	Assistant engineer.....	5 00 per day	1,198 50		1,198 50
A. T. O'Leary.....	Assistant engineer.....	5 00 per day	787 00	4 52	791 52
A. E. Steere.....	Assistant engineer.....	5 00 per day	974 50		974 50
W. G. Craig.....	Assistant engineer.....	5 00 per day	237 00		237 00
F. A. Biggs.....	Assistant engineer.....	5 00 per day	515 00		515 00
F. B. Williams.....	Assistant engineer.....	5 00 per day	315 00		315 00
T. A. Hendricks m.....	Leveler.....	4 50 per day	713 06		713 06
C. W. Morris, Jr.....	Leveler.....	4 50 per day	558 00		558 00

EASTERN DIVISION: ENGINEERING EXPENSES.

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Construction of Barge Canal—Head Office Account—(Concl'd).

NAME.	Rank.	Rate of compensation.	Servicers.	Travel.	Total.
Oscar Hasbrouck.....	Leveler.....	\$4 50 per day	\$683 00	\$7 40	\$690 40
Geo. H. Haley.....	Leveler.....	4 50 per day	531 00		531 00
C. E. Weed.....	Leveler.....	4 50 per day	432 00		432 00
L. Bartlett.....	Leveler.....	4 50 per day	297 00		297 00
W. A. Lafler.....	Leveler.....	4 50 per day	22 50		22 50
G. G. Sweet.....	Leveler.....	4 50 per day	1,003 00	4 61	1,007 61
J. B. Winter.....	Leveler.....	4 50 per day	447 50	3 90	451 40
S. F. Carlisle.....	Leveler.....	4 50 per day	359 00		359 00
Wm. H. Snyder.....	Leveler.....	4 50 per day	793 50	5 33	798 83
Louis Garbi.....	Leveler.....	4 50 per day	941 50		941 50
Frank Roberts.....	Rodman.....	4 00 per day	1,248 00		1,248 00
J. H. McElroy.....	Rodman.....	4 00 per day	148 00		148 00
G. W. Ellis.....	Rodman.....	3 50 per day	23 00		23 00
B. J. Lowenstein.....	Rodman.....	3 50 per day	815 50		815 50
F. H. Flint.....	Rodman.....	3 50 per day	248 50		248 50
H. C. Smith.....	Rodman.....	3 50 per day	28 00		28 00
H. S. Sparr.....	Rodman.....	3 50 per day	161 00		161 00
Howard Crounse.....	Chainman.....	3 00 per day	1,112 23	17 14	1,129 37
F. F. Fonda.....	Chainman.....	3 00 per day	506 16		506 16
W. E. Waterbury.....	Chainman.....	3 00 per day	518 00		518 00
M. Stanley Bierce.....	Chainman.....	2 50 per day	780 00		780 00
W. S. Ward.....	Chainman.....	2 50 per day	442 50		442 50
J. E. Myers.....	Chainman.....	2 50 per day	237 50		237 50
R. W. Fives.....	Chainman.....	2 50 per day	230 00		260 00
T. M. Hill.....	Title maker.....	3 00 per day	798 00		798 00
E. H. Wetsel.....	Foreman of Public Works.....	2 50 per day	327 50		327 50
J. L. Banker.....	Laborer.....	2 00 per day	730 00		730 00
Alexander Bils.....	Laborer.....	2 00 per day	120 00		120 00
Frank Bond.....	Laborer.....	2 00 per day	20 00		20 00
L. F. Cashman.....	Laborer.....	2 00 per day	144 00		144 00
Thomas Clancy.....	Laborer.....	2 00 per day	730 00		730 00
O. V. Crounse.....	Laborer.....	2 00 per day	72 00		72 00
F. C. Dickey.....	Laborer.....	2 00 per day	206 32		206 32
W. H. Dodd.....	Laborer.....	2 00 per day	178 00		178 00
J. B. Flower.....	Laborer.....	2 00 per day	184 00		184 00
B. Gasier.....	Laborer.....	2 00 per day	170 00		170 00
L. L. Gowdy.....	Laborer.....	2 00 per day	130 00		130 00
E. B. Garrison.....	Laborer.....	2 00 per day	54 00		54 00
Benj. R. Healey.....	Laborer.....	2 00 per day	442 00		442 00
C. H. Hill.....	Laborer.....	2 00 per day	36 00		36 00
H. A. Harcourt.....	Laborer.....	2 00 per day	578 00		578 00
Hugh Henderson, Jr.....	Laborer.....	2 00 per day	262 00		262 00
B. Houghtaling.....	Laborer.....	2 00 per day	262 00		262 00
W. G. Hoyt.....	Laborer.....	2 00 per day	154 00		154 00
C. F. Kinloch.....	Laborer.....	2 00 per day	606 00		606 00
Burt Koetteritz.....	Laborer.....	2 00 per day	56 00		56 00
John M. Macdonald.....	Laborer.....	2 00 per day	730 00	35 55	765 55
L. J. Mayer.....	Laborer.....	2 00 per day	206 00		206 00
Geo. D. Meer.....	Laborer.....	2 00 per day	148 00		148 00
Ned Niles.....	Laborer.....	2 00 per day	186 00	2 98	188 98
Eugene Nichols.....	Laborer.....	2 00 per day	120 00		120 00
E. C. Pierce.....	Laborer.....	2 00 per day	254 00		254 00
F. McEwan Pruyn.....	Laborer.....	2 00 per day	14 00		14 00
J. J. Roach.....	Laborer.....	2 00 per day	590 64		590 64
Thomas Rattoone.....	Laborer.....	2 00 per day	514 00		514 00
H. H. Stickney.....	Laborer.....	2 00 per day	272 00		272 00
G. H. Shufelt.....	Laborer.....	2 00 per day	172 00		172 00
C. A. Smith.....	Laborer.....	2 00 per day	180 00		180 00
Herbert Soules.....	Laborer.....	2 00 per day	208 00		208 00
F. R. Stevens.....	Laborer.....	2 00 per day	125 00		125 00
Louis Wachtel.....	Laborer.....	2 00 per day	80 00		80 00
E. H. Weeks.....	Laborer.....	2 00 per day	62 00		62 00
E. F. Weeks.....	Laborer.....	2 00 per day	46 00		46 00
W. A. Yanke.....	Laborer.....	2 00 per day	270 00		270 00
<i>Incidental Expenses.</i>					\$148,997 36
Instruments, tools and appliances.....			\$1,211 78		
Office rent.....			878 64		
Fuel and light.....			273 66		
Stationery and printing.....			1,775 53		
Postage.....			148 39		
Telephone and telegraph.....			233 01		
Miscellaneous.....			8,423 61		
Total.....					\$161,864 97

Construction of Barge Canal—Erie Canal.

Chapter 147, Laws of 1903; Chapter 143, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. W. Trumbull.	Division engineer.	\$3,000 per year	\$1,000 00	\$44 42	\$1,044 42
S. M. Savage.	Resident engineer.	2,400 per year	2,400 00	100 36	2,500 36
H. P. Willis.	Resident engineer.	2,400 per year	2,400 00	814 06	3,214 06
W. J. Valteau.	Financial clerk and auditor.	2,800 per year	100 00		100 00
Parkes D. Wendell.	Estimate clerk.	8 00 per day	230 00	10 73	300 73
W. B. Strong.	Estimate clerk.	8 00 per day	40 00		40 00
Mattie Kelly.	Stenographer.	83 33 per month	237 52		287 52
Wm. J. Weigmann.	Engineering draftsman.	8 00 per day	1,382 00		1,382 00
L. W. Fish.	Engineering draftsman.	4 80 per day	117 00		117 00
L. R. Ellis.	Engineering draftsman.	4 80 per day	230 00		230 00
F. R. Hebard.	Engineering draftsman.	4 00 per day	881 00		881 00
A. G. Acsin.	Engineering draftsman.	4 00 per day	1,144 00		1,144 00
Otis F. Lewis.	Engineering draftsman.	4 00 per day	1,068 13		1,068 13
Le Roy W. Clark.	Engineering draftsman.	4 00 per day	12 00		12 00
S. J. Bennett.	Tracer.	75 00 per month	156 00		156 00
C. E. Cruger.	Tracer.	50 00 per month	45 00		45 00
F. E. Gillen.	Tracer.	50 00 per month	45 00		45 00
C. S. Allen.	Tracer.	50 00 per month	12 50		12 50
A. E. Hannington.	Tracer.	50 00 per month	28 32		28 32
H. W. De Graff.	First assistant engineer.	7 00 per day	2,047 00	912 40	2,959 40
Edwin Hilborn.	Assistant engineer.	6 00 per day	1,560 00	594 50	2,154 50
P. W. O'Grady.	Assistant engineer.	6 00 per day	1,502 00	203 08	1,705 08
D. F. Fulton.	Assistant engineer.	6 00 per day	1,638 00	485 56	2,123 56
E. J. Pickwick.	Assistant engineer.	6 00 per day	300 00	101 59	401 59
Geo. I. Oakley.	Assistant engineer.	6 00 per day	1,716 00	804 60	2,520 60
F. P. Larnon.	Assistant engineer.	6 00 per day	1,729 00	26 97	1,755 97
J. A. O'Connor.	Assistant engineer.	6 00 per day	132 00		132 00
C. H. MacCulloch.	Assistant engineer.	6 00 per day	576 00	116 10	692 10
R. E. Phillips.	Assistant engineer.	8 00 per day	665 00		665 00
E. F. Ayres.	Assistant engineer.	8 00 per day	100 00		100 00
M. E. James.	Assistant engineer.	8 00 per day	1,430 00	8 13	1,438 13
R. H. Merri l.	Assistant engineer.	8 00 per day	1,485 80	324 64	1,820 14
J. N. Slater.	Assistant engineer.	8 00 per day	125 50		125 50
D. E. Bellows.	Assistant engineer.	8 00 per day	1,469 50		1,469 50
J. B. Maguire.	Assistant engineer.	8 00 per day	597 00		597 00
C. T. O'Leary.	Leveler.	4 50 per day	400 50	35 48	435 98
Hall Gleason.	Leveler.	4 50 per day	1,400 00		1,400 00
A. F. Steere.	Leveler.	4 50 per day	508 50		508 50
C. G. Rinney.	Leveler.	4 50 per day	58 50		58 50
H. A. Sylvester.	Leveler.	4 50 per day	648 00		648 00
I. S. Matlaw.	Leveler.	4 50 per day	1,003 00		1,003 00
C. A. Curtis.	Leveler.	4 50 per day	234 00		234 00
H. J. Richardson.	Rodman.	4 00 per day	444 00	23 36	473 36
C. L. Eltinge.	Rodman.	4 00 per day	354 00		354 00
G. G. Sweet.	Rodman.	4 00 per day	23 00		23 00
J. H. Sturdevant.	Rodman.	3 50 per day	45 50		45 50
T. L. Watkins.	Rodman.	3 50 per day	357 00		357 00
J. B. Lowenstein.	Rodman.	3 50 per day	210 00		210 00
C. F. de Clercq.	Rodman.	3 50 per day	239 00		239 00
C. A. Holmquist.	Rodman.	3 50 per day	168 00		168 00
David Noonan.	Rodman.	3 50 per day	66 50		66 50
C. A. Curtis.	Rodman.	3 50 per day	776 00		776 00
Eustace Hulsapple.	Rodman.	3 50 per day	948 50		948 50
H. S. Miller.	Chairman.	3 00 per day	477 00		477 00
C. E. Weed.	Chairman.	3 00 per day	318 00		318 00
F. L. Bisbee.	Chairman.	3 00 per day	78 00		78 00
S. W. Gage.	Chairman.	3 00 per day	234 00		234 00
F. B. Stoddard.	Chairman.	3 00 per day	15 00		15 00
R. J. Lyon.	Chairman.	3 00 per day	221 00		321 00
W. E. Petty.	Chairman.	3 00 per day	534 00		534 00
C. G. Styles.	Chairman.	2 50 per day	112 50		192 50
W. S. Ward.	Chairman.	2 50 per day	139 50		139 50
H. P. O'Bryan.	Chairman.	2 50 per day	760 00		760 00
J. B. Winter.	Chairman.	2 50 per day	250 00		250 00
R. Hanerley.	Chairman.	2 50 per day	345 00		345 00
W. H. Breen.	Foreman of borings.	3 50 per day	1,007 50		1,007 50
M. V. McCoy.	Foreman of borings.	3 50 per day	123 50		120 50
E. V. Allendorph.	Foreman of borings.	3 50 per day	864 50		864 50
M. R. Abbey.	Laborer.	2 00 per day	112 00	110 07	2 2 07
Chas. Argersinger.	Laborer.	2 00 per day	318 00		318 00
Albert Armstrong.	Laborer.	2 00 per day	22 00		22 00
Ralph Adams.	Laborer.	2 00 per day	36 00		36 00
F. C. Armstrong.	Laborer.	2 00 per day	84 00		84 00
Geo. A. Bold.	Laborer.	2 00 per day	630 00		630 00
A. H. Frayton.	Laborer.	2 00 per day	158 00		158 00

Construction of Barge Canal—Erie Canal—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. A. Bond.....	Laborer.....	\$2 00 per day	\$160 00		\$160 00
S. Bullock.....	Laborer.....	2 00 per day	166 00		166 00
I. G. Barnes.....	Laborer.....	2 00 per day	22 00		22 00
Edmund Cocker.....	Laborer.....	2 00 per day	602 00		602 00
R. J. Curtis.....	Laborer.....	2 00 per day	610 00		610 00
C. R. Cornwell.....	Laborer.....	2 00 per day	72 00		72 00
J. P. Clegg.....	Laborer.....	2 00 per day	284 00		284 00
Peter Corey.....	Laborer.....	2 00 per day	522 00		522 00
Fred Clark.....	Laborer.....	2 00 per day	18 00		18 00
T. Cady.....	Laborer.....	2 00 per day	76 00		76 00
W. H. Colby.....	Laborer.....	2 00 per day	16 00		16 00
H. L. Coons.....	Laborer.....	2 00 per day	168 00		168 00
J. E. Drummond.....	Laborer.....	2 00 per day	624 00		624 00
Geo. J. Duggan.....	Laborer.....	2 00 per day	156 00		156 00
C. Depew.....	Laborer.....	2 00 per day	212 00		212 00
J. M. Dillenbeck.....	Laborer.....	2 00 per day	140 00		140 00
James H. Duggan.....	Laborer.....	2 00 per day	108 00		108 00
C. F. Dillenbeck.....	Laborer.....	2 00 per day	74 00		74 00
H. F. Eagan.....	Laborer.....	2 00 per day	626 00		626 00
T. M. Ellenwood.....	Laborer.....	2 00 per day	364 00		364 00
H. A. Falconer.....	Laborer.....	2 00 per day	624 00		624 00
I. G. Flack.....	Laborer.....	2 00 per day	624 00		624 00
J. E. Foote.....	Laborer.....	2 00 per day	228 00		228 00
W. H. Garigan.....	Laborer.....	2 00 per day	364 00		364 00
W. S. Gray.....	Laborer.....	2 00 per day	190 00		190 00
Joseph Gergen.....	Laborer.....	2 00 per day	30 00		30 00
E. Germond.....	Laborer.....	2 00 per day	116 00		116 00
Blaine Gilday.....	Laborer.....	2 00 per day	624 00		624 00
Kelby Green.....	Laborer.....	2 00 per day	278 00		278 00
L. L. Gowdy.....	Laborer.....	2 00 per day	52 00		52 00
Perry Goodbred.....	Laborer.....	2 00 per day	132 00		132 00
E. B. Garrison.....	Laborer.....	2 00 per day	50 00		50 00
Joseph Harris.....	Laborer.....	2 00 per day	86 00		86 00
W. R. Haig.....	Laborer.....	2 00 per day	224 00		224 00
A. C. Hammond.....	Laborer.....	2 00 per day	198 00		198 00
E. W. Harris.....	Laborer.....	2 00 per day	204 00		204 00
Ray Hall.....	Laborer.....	2 00 per day	78 00		78 00
F. G. Hallenbeck.....	Laborer.....	2 00 per day	640 00		640 00
James Harrison.....	Laborer.....	2 00 per day	76 00		76 00
John Haley.....	Laborer.....	2 00 per day	274 00		274 00
H. D. Humpstone.....	Laborer.....	2 00 per day	56 00		56 00
A. D. Ilse.....	Laborer.....	2 00 per day	628 00		628 00
Wm. Ingalls.....	Laborer.....	2 00 per day	626 00		626 00
John Lavery.....	Laborer.....	2 00 per day	730 00		730 00
R. C. Kirkpatrick.....	Laborer.....	2 00 per day	624 00		624 00
R. L. Loder.....	Laborer.....	2 00 per day	624 00		624 00
R. W. Lowell.....	Laborer.....	2 00 per day	86 00		86 00
Irving Leon.....	Laborer.....	2 00 per day	104 00		104 00
David Keyser.....	Laborer.....	2 00 per day	84 00		84 00
L. A. Meron.....	Laborer.....	2 00 per day	520 00		520 00
W. S. MacLachlin.....	Laborer.....	2 00 per day	490 00		490 00
C. W. Machold.....	Laborer.....	2 00 per day	116 00		116 00
S. Y. MacGregor.....	Laborer.....	2 00 per day	624 00		624 00
A. D. Mesick.....	Laborer.....	2 00 per day	462 00		462 00
J. D. McDonald.....	Laborer.....	2 00 per day	112 00		112 00
James McDonell.....	Laborer.....	2 00 per day	38 00		38 00
Ned Niles.....	Laborer.....	2 00 per day	438 00		438 00
Wm. O'Donnell.....	Laborer.....	2 00 per day	133 00		133 00
Fred Otto.....	Laborer.....	2 00 per day	194 00		194 00
J. M. Pilling.....	Laborer.....	2 00 per day	336 00		336 00
S. Perry.....	Laborer.....	2 00 per day	136 00		136 00
John Phillips.....	Laborer.....	2 00 per day	378 00		378 00
Alvin Putnam.....	Laborer.....	2 00 per day	116 00		116 00
Ira Putnam.....	Laborer.....	2 00 per day	238 00		238 00
James E. Percy.....	Laborer.....	2 00 per day	130 00		130 00
Ralph Quackenbush.....	Laborer.....	2 00 per day	174 00		174 00
Clinton Quackenbush.....	Laborer.....	2 00 per day	62 00		62 00
E. D. Riley.....	Laborer.....	2 00 per day	278 00		278 00
A. W. Rogers.....	Laborer.....	2 00 per day	72 00		72 00
G. Reinsnyder.....	Laborer.....	2 00 per day	174 00		174 00
Wm. Reardon.....	Laborer.....	2 00 per day	148 00		148 00
Chas. Seaver.....	Laborer.....	2 00 per day	574 00		574 00
La Grand Seaver.....	Laborer.....	2 00 per day	574 00		574 00
Fred Sutherland.....	Laborer.....	2 00 per day	72 00		72 00
W. K. Smith.....	Laborer.....	2 00 per day	76 00		76 00

Construction of Barge Canal—Erie Canal—(Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. F. Stover.....	Laborer.....	\$2 00 per day	\$200 00		\$200 00
Geo. Strong.....	Laborer.....	2 00 per day	136 00		136 00
E. T. Smith.....	Laborer.....	2 00 per day	74 00		74 00
H. F. Smith.....	Laborer.....	2 00 per day	624 00		624 00
Ass. Sutta.....	Laborer.....	2 00 per day	436 00		436 00
Simon Seeds.....	Laborer.....	2 00 per day	40 00		40 00
J. G. Stewart.....	Laborer.....	2 00 per day	162 00		162 00
Chas. H. Shaper.....	Laborer.....	2 00 per day	178 00		178 00
T. Smith.....	Laborer.....	2 00 per day	124 00		124 00
J. Seaman.....	Laborer.....	2 00 per day	256 00		256 00
Chas. L. Spencer.....	Laborer.....	2 00 per day	210 00		210 00
Fred Trull.....	Laborer.....	2 00 per day	624 00		624 00
E. W. Thomas.....	Laborer.....	2 00 per day	444 00		444 00
A. E. Flack.....	Laborer.....	2 00 per day	99 00		99 00
Geo. Thomas.....	Laborer.....	2 00 per day	144 00		144 00
A. E. Trash.....	Laborer.....	2 00 per day	52 00		52 00
Joe Trainor.....	Laborer.....	2 00 per day	126 00		126 00
Geo. Terry.....	Laborer.....	2 00 per day	78 00		78 00
Thomas Van Slyke.....	Laborer.....	2 00 per day	350 00		350 00
J. S. Van Slyke.....	Laborer.....	2 00 per day	192 00		192 00
S. M. Van Allen.....	Laborer.....	2 00 per day	76 00		76 00
A. E. Vosburg.....	Laborer.....	2 00 per day	6 00		6 00
Seymour Williams.....	Laborer.....	2 00 per day	248 00		248 00
Wm. Wolf.....	Laborer.....	2 00 per day	748 56		748 56
Louis Wachtel.....	Laborer.....	2 00 per day	4 00		4 00
E. J. Warner.....	Laborer.....	2 00 per day	202 00		202 00
John White.....	Laborer.....	2 00 per day	142 00		142 00
John Williams.....	Laborer.....	2 00 per day	150 00		150 00
C. W. Young.....	Gage reader.....	14 00 per month	128 00		128 00
Henry Edick, Jr.....	Gage reader.....	7 00 per month	91 00		91 00
J. J. Vrooman.....	Gage reader.....	7 00 per month	56 00		56 00
S. S. Fonda.....	Gage reader.....	7 00 per month	56 00		56 00
J. B. Mackey.....	Gage reader.....	7 00 per month	56 00		56 00
J. Reepmeyer, Jr.....	Gage reader.....	7 00 per month	84 00		84 00
Wm. Quackenbush.....	Gage reader.....	7 00 per month	56 00		56 00
M. K. Freemeyer.....	Gage reader.....	7 00 per month	56 00		56 00
F. J. Cowles.....	Gage reader.....	7 00 per month	14 00		14 00
Wm. Butler.....	Gage reader.....	7 00 per month	56 00		56 00
A. H. Pickard.....	Gage reader.....	7 00 per month	56 00		56 00
John McLane.....	Gage reader.....	7 00 per month	14 00		14 00
E. L. Hoffman.....	Gage reader.....	7 00 per month	56 00		56 00
E. D. Jones.....	Gage reader.....	7 00 per month	13 30		13 30
Abram Devendorph.....	Gage reader.....	7 00 per month	63 00		63 00
J. B. Mahoney.....	Gage reader.....	7 00 per month	42 00		42 00
Robt. Wilson.....	Gage reader.....	6 00 per month	72 00		72 00
Loyd Kust.....	Gage reader.....	5 00 per month	60 00		60 00
Minnie E. Wheeler.....	Gage reader.....	5 00 per month	5 00		5 00
<i>Incidental Expenses.</i>					\$77,415 37
Instruments, tools and appliances.....			\$1,629 58		
Office rent.....			789 96		
Fuel and light.....			316 86		
Stationery and printing.....			124 24		
Postage.....			85 18		
Telephone and telegraph.....			300 95		
Miscellaneous.....			3,473 52		
					6,719 29
Total.....					\$84,134 66

Construction of Barge Canal — Champlain Canal.

Chapter 147, Laws of 1903; Chapter 143, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. W. Trumbull.....	Division engineer.....	\$3,600 per year	\$500 00	\$31 49	\$531 49
John R. Kaley.....	Resident engineer.....	2,400 per year	2,400 00	209 81	2,609 81
Parkes D. Wendell.....	Estimate clerk.....	5 00 per day	233 00	12 78	245 78
Mattie Kelly.....	Stenographer.....	83 33 per month	125 01		125 01
James E. Phinney, Jr.....	Stenographer.....	75 00 per month	429 84		429 84
C. M. Young.....	Stenographer.....	50 00 per month	172 58		172 58
S. W. Belding.....	Engineering draftsman.....	5 00 per day	1,495 50		1,495 50
James A. Galvin.....	Engineering draftsman.....	4 00 per day	700 06		700 06
S. B. Holmes.....	Engineering draftsman.....	4 00 per day	728 00		728 00
L. W. Irish.....	Engineering draftsman.....	4 00 per day	90 00		90 00
D. W. H. Daley.....	Engineering draftsman.....	4 00 per day	134 50		134 50
F. C. Koerner.....	Engineering draftsman.....	4 00 per day	152 00		152 00
W. J. Picard.....	Engineering draftsman.....	4 00 per day	160 00		160 00
E. G. Semon.....	Bridge draftsman.....	100 00 per mo.	132 25		132 25
John A. O'Connor.....	Assistant engineer.....	6 00 per day	251 00		251 00
Herbert Spencer.....	Assistant engineer.....	6 00 per day	1,254 00	113 34	1,367 34
P. J. Cleaver.....	Assistant engineer.....	6 00 per day	2,118 00	186 08	2,304 08
D. B. La Du.....	Assistant engineer.....	6 00 per day	1,701 00	978 39	2,679 39
R. S. Greenman.....	Assistant engineer.....	6 00 per day	6 00	4 06	10 06
W. B. Watson.....	Assistant engineer.....	5 00 per day	1,210 00		1,210 00
Homer C. Cline.....	Assistant engineer.....	5 00 per day	1,653 00		1,653 00
J. P. Newton.....	Leveler.....	4 50 per day	342 00		342 00
J. B. Winter.....	Leveler.....	4 50 per day	190 00		190 00
Harry Shoemaker.....	Leveler.....	4 50 per day	360 00		360 00
A. C. Richards.....	Leveler.....	4 50 per day	234 00		234 00
H. J. Richardson.....	Rodman.....	4 00 per day	304 00	88 64	392 64
James B. Foote.....	Rodman.....	4 00 per day	1,108 00		1,108 00
P. T. Gordon.....	Rodman.....	4 00 per day	1,348 50		1,348 50
C. L. Baldwin.....	Rodman.....	3 50 per day	388 50		388 50
A. E. Wood.....	Chainman.....	2 50 per day	42 50		42 50
A. M. Wain.....	Inspector Public Works.....	4 00 per day	660 00		660 00
Fred La Forge.....	Foreman of borings.....	4 00 per day	384 00		384 00
E. H. Wetsel.....	Foreman of borings.....	2 50 per day	162 00		162 00
Harry Bowen.....	Laborer.....	2 00 per day	88 00		88 00
G. E. Bragg.....	Laborer.....	2 00 per day	2 00		2 00
Clifford Carpenter.....	Laborer.....	2 00 per day	56 00		56 00
C. M. Chapman.....	Laborer.....	2 00 per day	644 00		644 00
J. P. Clegg.....	Laborer.....	2 00 per day	30 00		30 00
C. J. Fuller.....	Laborer.....	2 00 per day	244 00		244 00
L. L. Gowdy.....	Laborer.....	2 00 per day	76 00		76 00
A. C. Hammond.....	Laborer.....	2 00 per day	32 00		32 00
J. P. Havery.....	Laborer.....	2 00 per day	6 00		6 00
J. Harris.....	Laborer.....	2 00 per day	56 00		56 00
L. R. Holmes.....	Laborer.....	2 00 per day	110 00		110 00
John Jennings.....	Laborer.....	2 00 per day	142 50		142 50
Joseph Jennings.....	Laborer.....	2 00 per day	244 00		244 00
F. B. Kraft.....	Laborer.....	2 00 per day	624 00		624 00
John Malin.....	Laborer.....	2 00 per day	580 00		580 00
Forrest Mattison.....	Laborer.....	2 00 per day	154 00		154 00
Geo. C. Maxfield.....	Laborer.....	2 00 per day	720 00		720 00
W. S. McLachlin.....	Laborer.....	2 00 per day	104 00		104 00
Nelson Morey.....	Laborer.....	2 00 per day	634 00		634 00
H. W. Morris.....	Laborer.....	2 00 per day	24 00		24 00
H. J. Palets.....	Laborer.....	2 00 per day	142 00		142 00
J. J. Raup.....	Laborer.....	2 00 per day	324 00		324 00
John Rock.....	Laborer.....	2 00 per day	626 00		626 00
W. A. Sanders.....	Laborer.....	2 00 per day	708 00		708 00
S. Simons.....	Laborer.....	2 00 per day	20 00		20 00
A. C. Snyder.....	Laborer.....	2 00 per day	130 00		130 00
F. G. Tilton.....	Laborer.....	2 00 per day	624 00		624 00
A. S. Trumbull.....	Laborer.....	2 00 per day	92 00		92 00
A. Van Tassel.....	Laborer.....	2 00 per day	300 00		300 00
B. T. Thebo.....	Gage reader.....	7 00 per month	84 00		84 00
S. H. Pearson.....	Gage reader.....	7 00 per month	84 00		84 00
S. L. Cluett.....	Gage reader.....	7 00 per month	56 00		56 00
F. Simon.....	Gage reader.....	7 00 per month	56 00		56 00
F. C. Bristol.....	Gage reader.....	7 00 per month	84 00		84 00
John Elkins.....	Gage reader.....	7 00 per month	9 03		9 03
R. B. Searles.....	Gage reader.....	7 00 per month	49 00		49 00
Marvin Elms.....	Gage reader.....	7 00 per month	18 51		18 51
Wm. E. Downing.....	Gage reader.....	7 00 per month	84 00		84 00
Geo. W. Baldwin.....	Gage reader.....	7 00 per month	56 00		56 00
H. C. Tinker.....	Gage reader.....	7 00 per month	84 00		84 00
Geo. Hammond.....	Gage reader.....	7 00 per month	84 00		84 00

Construction of Barge Canal — Champlain Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Robert Metcalf.....	Gage reader.....	\$7 00 per month	\$29 80		\$29 80
Leon C. Brazier.....	Gage reader.....	7 00 per month	84 00		84 00
Wm. B. Dunston.....	Gage reader.....	7 00 per month	70 00		70 00
W. D. La Bar.....	Gage reader.....	7 00 per month	42 00		42 00
Marie Searles.....	Gage reader.....	7 00 per month	7 00		7 00
W. J. Curtis.....	Gage reader.....	7 00 per month	28 00		28 00
<i>Incidental Expenses.</i>					\$31,328 67
Instruments, tools and appliances.....				\$75 87	
Office rent.....				326 00	
Fuel and light.....				229 67	
Stationery and printing.....				48 32	
Postage.....				57 18	
Telephone and telegraph.....				119 86	
Miscellaneous.....				669 39	
					1,536 30
Total.....					\$32,864 97

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 486, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. W. Trumbull.....	Division engineer.....	\$3,000 per year		\$250 70	\$250 70
C. H. Flanigan.....	First resident engineer.....	2,700 per year	\$2,500 00	324 12	2,824 12
F. M. Williams.....	Resident engineer.....	2,400 per year	2,169 00	1,043 06	3,212 06
E. A. Lamb.....	Resident engineer.....	2,400 per year	1,483 00	246 38	1,729 38
Dana W. Robbins.....	Resident engineer.....	2,400 per year	2,106 00	99 60	2,205 60
H. K. Bishop.....	Hydraulic macadam expert.....	8 00 per day	48 00		48 00
David C. Wood.....	Expert surveyor.....	6 00 per day	156 00		156 00
W. J. Valteau.....	Financial clerk and auditor.....	2,800 per year	400 00	34 06	434 06
J. A. Underwood.....	Financial clerk.....	5 00 per day	122 00		122 00
Parkes D. Wendell.....	Estimate clerk.....	5 00 per day	180 00	7 75	187 75
W. B. Strong.....	Estimate clerk.....	5 00 per day	645 00		645 00
H. W. Cowlbeck.....	Stenographer.....	75 00 per month	59 17		59 17
A. D. Sharpe.....	Stenographer.....	50 00 per month	14 52		14 52
J. E. Kirk.....	Messenger.....	60 00 per month	224 00		224 00
O. J. Dempster.....	Assistant engineer.....	6 00 per day	1,938 00	2,128 07	4,066 07
Perry Filkin.....	Assistant engineer.....	6 00 per day	1,673 00	363 40	2,036 40
J. C. Finch.....	Assistant engineer.....	6 00 per day	1,653 00	176 43	1,829 43
F. B. Morse.....	Assistant engineer.....	6 00 per day	1,872 00	5 79	1,877 79
N. A. Taylor.....	Assistant engineer.....	6 00 per day	1,720 00	766 00	2,486 00
G. H. Miller.....	Assistant engineer.....	6 00 per day	948 00	20 80	968 80
J. A. O'Connor.....	Assistant engineer.....	6 00 per day	457 00	4 63	461 63
O. C. Richard.....	Assistant engineer.....	6 00 per day	122 00	21 16	143 16
J. L. Chapman.....	Assistant engineer.....	6 00 per day	895 00	70 55	965 55
F. P. Larmon.....	Assistant engineer.....	6 00 per day	1 60		1 60
H. E. Breed.....	Assistant engineer.....	6 00 per day	1,560 00	822 53	2,382 53
C. M. Cole, Jr.....	Assistant engineer.....	6 00 per day	983 00	2 2 68	1,255 68
J. B. Wright.....	Assistant engineer.....	6 00 per day	903 00	27 21	930 21
G. R. Winslow.....	Assistant engineer.....	6 00 per day	504 00		504 00
A. H. Pratt.....	Assistant engineer.....	6 00 per day	324 00		324 00
R. S. Greenman.....	Assistant engineer.....	6 00 per day	18 00	22 60	40 60
C. R. Allen, Jr.....	Assistant engineer.....	6 00 per day	310 00		310 00
E. F. Ayres.....	Assistant engineer.....	6 00 per day	384 00		384 00
R. J. Harding.....	Assistant engineer.....	6 00 per day	402 00	23 34	425 34
C. F. Fisher.....	Assistant engineer.....	6 00 per day	388 00	10 25	398 25
R. J. Murray.....	Assistant engineer.....	6 00 per day	288 00	13 67	301 67
F. J. Mulvaney.....	Assistant engineer.....	6 00 per day	1,663 50	297 97	1,961 47
L. T. Howard.....	Assistant engineer.....	5 00 per day	655 00	1,225 42	1,880 42
F. F. Gordon.....	Assistant engineer.....	5 00 per day	150 00		150 00
E. G. Raynor.....	Assistant engineer.....	5 00 per day	1,269 00		1,269 00
N. L. Simmons.....	Assistant engineer.....	5 00 per day	855 00	3 65	858 65
F. J. Seery.....	Assistant engineer.....	5 00 per day	390 00		390 00
H. J. Langlois.....	Assistant engineer.....	5 00 per day	170 00	19 00	189 00

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
E. J. Howe.....	Assistant engineer	\$5 00 per day	\$210 00		\$210 00
W. G. Craig.....	Assistant engineer	5 00 per day	289 00		289 00
G. H. Penfield.....	Assistant engineer	5 00 per day		\$3 80	3 80
J. H. Sturdevant.....	Assistant engineer	5 00 per day	1,214 50	1,005 73	2,220 23
Geo. A. Ensign.....	Leveler	5 00 per day	1,600 00	74 58	1,674 58
Ralph Russell.....	Leveler	5 00 per day	1,280 00	176 98	1,456 98
R. D. Hayrs.....	Leveler	5 00 per day	1,343 00	307 28	1,650 28
A. C. Perkins.....	Leveler	5 00 per day	1,296 00	579 38	1,875 38
L. L. Melius.....	Leveler	5 00 per day	1,212 00	32 67	1,244 67
Theo. A. Hendrickson.....	Leveler	4 50 per day	396 00		396 00
J. K. Browne.....	Leveler	4 50 per day	499 50		499 50
M. W. Williams.....	Leveler	4 50 per day	454 50	543 92	998 42
T. E. Schoenlaub.....	Leveler	4 50 per day	237 00		297 00
G. A. Flynn.....	Leveler	4 50 per day	676 50	6 30	682 80
Chas. F. Crowley.....	Leveler	4 50 per day	243 00		243 00
Geo. A. Hool.....	Leveler	4 50 per day	108 00		108 00
F. C. Woodward.....	Leveler	4 50 per day	198 00		198 00
H. Shoemaker.....	Leveler	4 50 per day	566 00		566 00
Jesse C. Patrick.....	Inspector of highways	4 50 per day	1,399 50	216 59	1,616 09
James T. Brady.....	Inspector of highways	4 50 per day	1,377 00	61 90	1,438 90
H. C. Titus.....	Inspector of highways	4 50 per day	1,476 00	26 32	1,502 32
F. L. Bisbee.....	Inspector of highways	4 50 per day	816 00	235 49	1,051 49
F. W. Hartwell.....	Inspector of highways	4 00 per day	971 00	60 69	1,031 69
R. O. Hollenbeck.....	Inspector of highways	4 00 per day	3 2 00	14 18	386 18
H. S. Mattimore.....	Inspector of highways	4 00 per day	966 50	1 55	968 05
Elbert W. Sylvester.....	Engineering draftsman	5 00 per day	1,483 00	3 35	1,486 35
W. E. Petty.....	Engineering draftsman	5 00 per day	572 00	26 85	598 85
Wm. R. Gordon.....	Engineering draftsman	5 00 per day	603 00	2 20	606 20
Mark W. Nelson.....	Engineering draftsman	5 00 per day	1,123 00	46 72	1,172 72
Geo. L. Schillner.....	Engineering draftsman	5 00 per day	201 00		201 00
B. O. Burgin.....	Engineering draftsman	5 00 per day	25 00		25 00
R. E. Phillips.....	Engineering draftsman	5 00 per day	51 98	1 76	53 74
L. W. Irish.....	Engineering draftsman	4 50 per day	342 00	235 53	577 53
L. W. Clark.....	Engineering draftsman	4 00 per day	332 00	521 34	853 34
R. F. T. Wilkes.....	Engineering draftsman	4 00 per day	206 00		206 00
W. J. Picard.....	Engineering draftsman	4 00 per day	52 10		52 10
J. R. McClintock.....	Engineering draftsman	4 00 per day	32 00		32 00
S. J. Bennett.....	Tracer	75 00 per month	422 00		422 00
H. J. Richardson.....	Rodman	4 00 per day	52 00	4 30	56 30
M. D. Casler.....	Rodman	4 00 per day	144 00		144 00
C. R. De Graff.....	Rodman	4 00 per day	460 00	6 31	466 31
W. R. Trumbull.....	Rodman	4 00 per day	589 00	219 10	1,108 10
J. C. Bell.....	Rodman	4 00 per day	316 00		316 00
J. J. Huber.....	Rodman	4 00 per day	62 00		62 00
H. C. Wells.....	Rodman	4 00 per day	390 00	4 80	394 80
A. G. Chapman.....	Rodman	4 00 per day	224 00	15 30	239 30
C. C. Ahlcs.....	Rodman	3 50 per day	182 00	6 56	188 56
R. H. Sammons.....	Rodman	3 50 per day	237 50	4 49	241 99
J. T. O'Hara.....	Rodman	3 50 per day	690 50	254 20	944 70
F. J. Kinney.....	Rodman	3 50 per day	106 00		106 00
W. P. Nichols.....	Rodman	3 50 per day	168 00		168 00
A. J. Kaufman.....	Rodman	3 50 per day	168 00		168 00
S. R. Tighe.....	Rodman	3 50 per day	66 50		66 50
D. Noonan.....	Rodman	3 50 per day	38 50		38 50
J. D. Rutledge.....	Rodman	3 50 per day	161 00		161 00
J. A. O'Donnell.....	Rodman	3 50 per day	106 00		106 00
E. C. Getty, Jr.....	Rodman	3 50 per day	112 50		112 50
A. Laredo.....	Rodman	3 50 per day	233 50		263 50
S. F. Carlisle.....	Rodman	3 50 per day	45 50		45 50
E. C. Hackett.....	Rodman	3 50 per day	126 00		126 00
Lee Walker.....	Rodman	3 50 per day	703 50	95	704 45
A. W. Smith.....	Rodman	3 50 per day	638 00	325 54	963 54
A. J. Muench.....	Rodman	3 50 per day	402 50		402 50
H. P. Condon.....	Rodman	3 50 per day	402 50		402 50
C. R. Waters.....	Rodman	3 50 per day	168 00		168 00
C. F. de Clercq.....	Rodman	3 50 per day	17 50		17 50
De Witt H. Daley.....	Rodman	3 50 per day	10 50		10 50
F. E. Reed.....	Rodman	3 50 per day	178 50		178 50
O. H. Jones.....	Rodman	3 50 per day	126 00		126 00
F. H. Owens.....	Chainman	3 00 per day	960 00	67 32	1,027 32
C. H. Foadick.....	Chainman	3 00 per day	504 00	48 65	552 65
J. R. Mahan.....	Chainman	3 00 per day	981 00		981 00
W. E. Waterbury.....	Chainman	3 00 per day	230 00		230 00
H. R. Bed-ll.....	Chainman	3 00 per day	706 00	28 00	734 00
C. H. Chilvers.....	Chainman	3 00 per day	21 00		21 00

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
R. D. Cooper	Chairman	\$3 00 per day	\$51 00		\$51 00
R. N. Barrett	Chairman	3 00 per day	75 00	\$22 33	97 33
H. L. Michaels	Chairman	3 00 per day	48 00	3 17	51 17
P. L. Classen	Chairman	3 00 per day	178 00		178 00
P. D. Jump	Chairman	2 50 per day	457 50		457 50
J. F. Myers	Chairman	2 50 per day	67 50	7 72	75 22
R. Haverly	Chairman	2 50 per day	135 00		135 00
L. Grossman	Chairman	2 50 per day	30 00		30 00
E. V. Allendorph	Foreman of borings	3 50 per day	126 00	78 60	204 60
Albert Armstrong	Laborer	2 00 per day	506 00	4 68	510 68
M. R. Abbey	Laborer	2 00 per day	288 00	68 73	356 73
G. P. Ames	Laborer	2 00 per day	218 00		218 00
F. M. Abel	Laborer	2 00 per day	130 00		130 00
A. J. Allen	Laborer	2 00 per day	130 00		130 00
D. G. Ashton	Laborer	2 00 per day	92 00		92 00
David Arnold	Laborer	2 00 per day	66 00		66 00
F. A. Bedell	Laborer	2 00 per day	514 00	14 80	528 80
M. J. Byington	Laborer	2 00 per day	110 00		110 00
Geo. A. Blauvelt	Laborer	2 00 per day	628 00	15 04	643 04
T. T. Rice II	Laborer	2 00 per day	12 00		12 00
Harry Bowen	Laborer	2 00 per day	594 00		594 00
R. N. Barrett	Laborer	2 00 per day	100 00		100 00
H. E. Burke	Laborer	2 00 per day	60 00		60 00
C. F. Bown	Laborer	2 00 per day	124 00		124 00
A. W. Brayton	Laborer	2 00 per day	14 00		14 00
Alex. Beels	Laborer	2 00 per day	412 00		412 00
D. J. Brown	Laborer	2 00 per day	124 00		124 00
L. A. Bouton	Laborer	2 00 per day	123 00		126 00
S. BrumEAU	Laborer	2 00 per day	108 00		108 00
A. L. Bush	Laborer	2 00 per day	108 00		108 00
L. F. Birdall	Laborer	2 00 per day	84 00		84 00
F. Bond	Laborer	2 00 per day	44 00		44 00
P. H. Budd	Laborer	2 00 per day	66 00		66 00
S. W. Budlong	Laborer	2 00 per day	56 00		56 00
S. M. Bullock	Laborer	2 00 per day	46 00		46 00
M. L. Byington	Laborer	2 00 per day	32 00		32 00
Chas. Boughton	Laborer	2 00 per day	50 00		50 00
F. W. Buhler	Laborer	2 00 per day	4 00		4 00
A. Carrera	Laborer	2 00 per day	23 00		26 00
W. B. Collins	Laborer	2 00 per day	496 00	102 36	510 36
C. R. Cornwell	Laborer	2 00 per day	602 00		602 00
Austin Clare	Laborer	2 00 per day	22 00		22 00
A. B. Culver	Laborer	2 00 per day	490 00		490 00
W. D. Collins	Laborer	2 00 per day	204 00		204 00
R. P. Campfield	Laborer	2 00 per day	56 00		56 00
S. C. Clobridge	Laborer	2 00 per day	140 00		140 00
James Cohn	Laborer	2 00 per day	76 00	4 33	80 33
N. T. Clark	Laborer	2 00 per day	66 00		66 00
L. L. Crozier	Laborer	2 00 per day	86 00		86 00
John Crooks	Laborer	2 00 per day	12 00		12 00
A. F. Crosby	Laborer	2 00 per day	10 00		10 00
T. J. Cusack, Jr.	Laborer	2 00 per day	102 00		102 00
Geo. E. Cantine	Laborer	2 00 per day	62 00		62 00
Pierce Caw	Laborer	2 00 per day	58 00		58 00
James Cavanaugh	Laborer	2 00 per day	40 00		40 00
Chas. L. Coddling	Laborer	2 00 per day	20 00		20 00
Alex. Conning	Laborer	2 00 per day	14 00		14 00
Wm. C. Dearstyne	Laborer	2 00 per day	38 00	66	38 66
J. C. Duggan	Laborer	2 00 per day	520 00		520 00
C. H. Darke	Laborer	2 00 per day	376 00		376 00
G. J. Duggan	Laborer	2 00 per day	436 00		436 00
Wm. Doty, Jr.	Laborer	2 00 per day	120 00		120 00
A. R. Downing	Laborer	2 00 per day	24 00		24 00
J. R. Draper	Laborer	2 00 per day	18 00		18 00
T. J. Donohue	Laborer	2 00 per day	36 00		36 00
H. C. Englund	Laborer	2 00 per day	284 00		284 00
E. A. Failie	Laborer	2 00 per day	540 00		540 00
Clay Ferguson	Laborer	2 00 per day	58 00		58 00
C. B. Finch	Laborer	2 00 per day	16 00		16 00
W. S. Gray	Laborer	2 00 per day	442 00	6 36	448 36
E. B. Garrison	Laborer	2 00 per day	162 00		162 00
Alex. Gauthier	Laborer	2 00 per day	156 00		156 00
M. H. Guphill	Laborer	2 00 per day	146 00		146 00
H. E. Gabriels	Laborer	2 00 per day	90 00		90 00
J. S. Greenough	Laborer	2 00 per day	138 00	70 50	208 50

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. L. Cowdy	Laborer.	\$2 00 per day	\$80 00	\$10 52	\$70 52
W. H. Garigan	Laborer.	2 00 per day	80 00		80 00
C. J. Gibson	Laborer.	2 00 per day	58 00		58 00
Harold Graves	Laborer.	2 00 per day	50 00		50 00
J. S. Heath	Laborer.	2 00 per day	624 00		624 00
W. N. Henning	Laborer.	2 00 per day	48 00		48 00
E. W. Hancock	Laborer.	2 00 per day	218 00		218 00
H. D. Humpstone	Laborer.	2 00 per day	92 00		92 00
Benj. R. Healey	Laborer.	2 00 per day	78 00		78 00
W. D. Hildreth	Laborer.	2 00 per day	160 00		160 00
J. D. Henderson, Jr.	Laborer.	2 00 per day	92 00		92 00
J. T. Houlihan	Laborer.	2 00 per day	100 00		100 00
Geo. Hess	Laborer.	2 00 per day	58 00		58 00
Frank Holcomb	Laborer.	2 00 per day	76 00		76 00
G. H. Harter	Laborer.	2 00 per day	96 00		96 00
Frank Hildreth	Laborer.	2 00 per day	58 00		58 00
John Hughes	Laborer.	2 00 per day	58 00		58 00
L. G. Hill	Laborer.	2 00 per day	18 00		18 00
Hollis Husted	Laborer.	2 00 per day	30 00		30 00
C. W. Hansburg	Laborer.	2 00 per day	34 00		34 00
A. Hornbrook	Laborer.	2 00 per day	16 00		16 00
A. G. Horn	Laborer.	2 00 per day	12 00		12 00
Garret Ives	Laborer.	2 00 per day	94 00		94 00
Sidney Ives	Laborer.	2 00 per day	246 00		246 00
B. W. Koesteritz	Laborer.	2 00 per day	216 00		216 00
Brook Kofka	Laborer.	2 00 per day	90 00		90 00
E. Keller	Laborer.	2 00 per day	84 00		84 00
F. Krasnie	Laborer.	2 00 per day	116 00		116 00
C. W. Knowles	Laborer.	2 00 per day	88 00		88 00
C. G. Kirby	Laborer.	2 00 per day	88 00		88 00
Joseph Karr	Laborer.	2 00 per day	94 00		94 00
W. J. Kennedy	Laborer.	2 00 per day	36 00		36 00
David Lockwood	Laborer.	2 00 per day	50 00		50 00
D. N. Lewis	Laborer.	2 00 per day	124 00		124 00
E. H. Leggett	Laborer.	2 00 per day	60 00		60 00
E. H. Langdon	Laborer.	2 00 per day	54 00		54 00
A. P. Lynch	Laborer.	2 00 per day	90 00		90 00
A. J. Myers	Laborer.	2 00 per day	206 00		206 00
A. J. Miles	Laborer.	2 00 per day	580 00		580 00
B. E. Murray	Laborer.	2 00 per day	126 00		126 00
B. C. Mooney	Laborer.	2 00 per day	114 00		114 00
F. H. Macy	Laborer.	2 00 per day	120 00		120 00
H. McFarlane	Laborer.	2 00 per day	66 00		66 00
J. C. McElroy	Laborer.	2 00 per day	96 00		96 00
James W. Moon	Laborer.	2 00 per day	96 00		96 00
Herbert Michael	Laborer.	2 00 per day	76 00		76 00
A. McMasters	Laborer.	2 00 per day	52 00		52 00
M. H. Muleneaux	Laborer.	2 00 per day	10 00		10 00
Arthur Niles	Laborer.	2 00 per day	50 00		50 00
Geo. C. Newberry	Laborer.	2 00 per day	34 00		34 00
J. J. O'Hara, Jr.	Laborer.	2 00 per day	624 00		624 00
D. T. O'Leary	Laborer.	2 00 per day	118 00		118 00
Vibert Ostrander	Laborer.	2 00 per day	74 00		74 00
W. M. Payne	Laborer.	2 00 per day	468 00	107 93	575 93
Harry Poole	Laborer.	2 00 per day	398 00	2 96	400 96
V. B. Patterson	Laborer.	2 00 per day	196 00		196 00
F. McEwan Fruyn	Laborer.	2 00 per day	142 00	45 58	187 58
H. S. Parsons	Laborer.	2 00 per day	166 00	4 60	160 60
H. B. Parker	Laborer.	2 00 per day	102 00		102 00
J. E. Peabits	Laborer.	2 00 per day	80 00		80 00
J. F. Parkhurst	Laborer.	2 00 per day	34 00		34 00
G. M. Quackenbush	Laborer.	2 00 per day	96 00		96 00
A. P. Reynolds	Laborer.	2 00 per day	28 00		28 00
A. W. Rogers	Laborer.	2 00 per day	36 00	84	36 84
E. P. Ramsey	Laborer.	2 00 per day	464 00		464 00
W. J. Rhinehart	Laborer.	2 00 per day	20 00		20 00
E. D. Riley	Laborer.	2 00 per day	278 00		278 00
J. H. Reynolds	Laborer.	2 00 per day	230 00		230 00
E. R. S. Reeder	Laborer.	2 00 per day	70 00		70 00
B. V. N. Rockfellow	Laborer.	2 00 per day	58 00		58 00
H. E. Reeves	Laborer.	2 00 per day	118 00		118 00
Raymond Rhodes	Laborer.	2 00 per day	8 00		8 00
J. F. Reynolds	Laborer.	2 00 per day	8 00		8 00
H. W. Ryan	Laborer.	2 00 per day	56 00		56 00
G. E. Richardson	Laborer.	2 00 per day	66 00		66 00

Improvement of Public Highways—(Concluded).

NAME.	Rank.	Rate of compensation.	Serviers.	Travel.	Total.
E. H. Robinson	Laborer	\$2 00 per day	\$44 00		\$44 00
Geo. Rogers	Laborer	2 00 per day	106 00		106 00
J. B. Ryder	Laborer	2 00 per day	132 00		132 00
Thomas Rattoone	Laborer	2 00 per day	40 00		40 00
Angus Rockwell	Laborer	2 00 per day	50 00		50 00
John Schumann, Jr.	Laborer	2 00 per day	342 00	\$121 85	463 85
Herbert Soules	Laborer	2 00 per day	230 00		230 00
Arthur Shwrtill	Laborer	2 00 per day	142 00		142 00
F. M. Sutherland	Laborer	2 00 per day	524 00		524 00
C. A. Smith	Laborer	2 00 per day	166 00		166 00
G. H. Shufelt	Laborer	2 00 per day	340 00		340 00
C. F. Stover	Laborer	2 00 per day	432 00	1 54	433 54
H. A. Schaup	Laborer	2 00 per day	116 00		116 00
R. O. Shelley	Laborer	2 00 per day	116 00		116 00
H. G. Stuts	Laborer	2 00 per day	74 00		74 00
R. N. G. Sauerberry	Laborer	2 00 per day	10 00		10 00
J. H. Sheppard	Laborer	2 00 per day	66 00		66 00
Geo. F. Small	Laborer	2 00 per day	98 00		98 00
C. E. Smith	Laborer	2 00 per day	138 00		138 00
C. G. Schuyler	Laborer	2 00 per day	44 00		44 00
Thos. Sheridan	Laborer	2 00 per day	10 00		10 00
W. A. Spallman	Laborer	2 00 per day	23 00		23 00
Arch Stewart	Laborer	2 00 per day	34 00		34 00
Harry Town	Laborer	2 00 per day	180 00		180 00
L. Tucker	Laborer	2 00 per day	68 00		68 00
J. B. Travers	Laborer	2 00 per day	64 00		64 00
T. A. Taylor	Laborer	2 00 per day	14 00		14 00
Alvin Ury	Laborer	2 00 per day	120 00		120 00
Ralph Ury	Laborer	2 00 per day	82 00		82 00
H. C. Underhill	Laborer	2 00 per day	82 00		82 00
Ambrose Van Tassel	Laborer	2 00 per day	162 00	100 30	262 30
Luke Van Valkenburg	Laborer	2 00 per day	102 00		102 00
Frank Van Valkenburg	Laborer	2 00 per day	90 00		90 00
J. A. Wynkoop	Laborer	2 00 per day	442 00	115 50	557 50
A. M. Wait	Laborer	2 00 per day	52 00		52 00
H. H. Waters	Laborer	2 00 per day	144 00		144 00
H. H. Williams	Laborer	2 00 per day	104 00	1 38	105 38
J. L. Walton	Laborer	2 00 per day	120 00		120 00
Geo. W. Ward	Laborer	2 00 per day	96 00		96 00
Louis Wachtel	Laborer	2 00 per day	70 00	13 25	83 25
J. H. Wallace	Laborer	2 00 per day	23 00		23 00
T. L. Way	Laborer	2 00 per day	68 00		68 00
Frank Wilson	Laborer	2 00 per day	12 00		12 00
Jep Warren	Laborer	2 00 per day	34 00		34 00
W. J. Ward	Laborer	2 00 per day	10 00		10 00
<i>Incidental Expenses.</i>					\$110,637 16
Stationery and printing				\$420 52	
Livery				7,755 93	
Fuel and light				64 78	
Postage				101 79	
Office rent				776 00	
Telephone and telegraph				2 2 24	
Miscellaneous				8,420 31	
Total					17,811 57
					\$123,448 73

Maintenance and Repairs of Improved Public Highways.

Chap. 115, Laws of 1898; Chap. 468, Laws of 1906; Chap. 686, Laws of 1906.

Name of road.	Road No.	Town.	County.	Total.
Lebanon-Pittsfield.....	4	New Lebanon.....	Columbia.....	\$247 75
Delaware Turnpike, section 1.....	7	Bethlehem.....	Albany.....	777 12
Troy and Brunswick, section 1.....	10	Brunswick.....	Rensselaer.....	639 82
Troy and Greenbush, section 1.....	11	North Greenbush.....	Rensselaer.....	137 47
White Plains-Cross Road.....	20	North Castle.....	Westchester.....	592 05
Loudon.....	22	Colonie.....	Albany.....	855 34
Troy and Brunswick, section 2.....	25	Brunswick.....	Rensselaer.....	253 18
Troy and Greenbush, section 2.....	26	North Greenbush.....	Rensselaer.....	599 18
Amsterdam-Minaville.....	32	Florida.....	Montgomery.....	172 20
Gloversville-Mayfield.....	33	Johnstown and Mayfield.....	Fulton.....	56 40
Griffins Corners.....	36	Middletown.....	Delaware.....	5 00
Waterford, section 1.....	39	Waterford.....	Saratoga.....	16 75
Delaware Turnpike, section 2.....	41	Bethlehem.....	Albany.....	925 33
Newburgh-Woodbury.....	42	New Windsor, Cornwall and Woodbury.....	Orange.....	927 46
Cochecton Turnpike, section 2.....	43	Newburgh and Montgomery.....	Orange.....	582 10
Goshen-Florida.....	44	Goshen and Warwick.....	Orange.....	111 87
Middletown-Pine Bush.....	45	Crawford and Wallkill.....	Orange.....	85 00
Mt. Kisco-Bedford.....	51	Bedford.....	Westchester.....	390 75
Unionville-McKeels Corners.....	52	Mt. Pleasant.....	Westchester.....	118 00
Hoags Corners.....	55	Nassau.....	Rensselaer.....	74 25
Windsor, section 1.....	57	Champlain.....	Clinton.....	74 02
Glen Falls-Saratoga.....	58	Moreau.....	Saratoga.....	277 07
Waterford, section 2.....	59	Half Moon.....	Saratoga.....	452 32
Montgomery-Goshen.....	65	Montgomery, Hamptonburg and Goshen.....	Orange.....	353 60
Troy and Brunswick, section 3.....	84	Brunswick.....	Rensselaer.....	184 47
Delmar-Slingerlands.....	92	Bethlehem.....	Albany.....	314 68
Florida-Warwick.....	93	Warwick.....	Orange.....	56 24
Middletown-Goshen.....	95	Wawayanda, Wallkill and Goshen.....	Orange.....	677 25
Amsterdam-Minaville, section 2.....	96	Florida.....	Montgomery.....	181 40
Barracks.....	102	East Greenbush.....	Rensselaer.....	303 22
Fultonville-Glen.....	107	Glen.....	Montgomery.....	428 69
West Mohawk River.....	108	Amsterdam.....	Montgomery.....	605 73
Argersinger.....	109	Johnstown.....	Fulton.....	407 26
Briggs.....	110	Johnstown.....	Fulton.....	354 37
Middletown-Pine Bush.....	114	Wallkill.....	Orange.....	16 00
Central Valley-Turner, section 1.....	115	Woodbury and Monroe.....	Orange.....	8 00
Kingston-Rifton.....	116	Ulster and Esopus.....	Ulster.....	1,754 75
Loudon, section 2.....	119	Colonie.....	Albany.....	16 52
Canajoharie-Sharon Springs.....	120	Canajoharie.....	Montgomery.....	852 66
Violet Avenue.....	135	Poughkeepsie and Hyde Park.....	Dutchess.....	70 11
Windsor, section 2.....	136	Champlain.....	Clinton.....	145 63
Plattsburg-Keeseville, section 2.....	137	Plattsburg and Peru.....	Clinton.....	125 09
Plattsburg-Moore's, section 1.....	138	Beekmantown and Chazy.....	Clinton.....	62 32
Delaware River.....	145	Delhi.....	Delaware.....	5 00
Newburgh-Campbell Hall.....	153	Newburgh, New Windsor and Hamptonburg.....	Orange.....	2,196 26
Fonda, West.....	155	Mohawk.....	Montgomery.....	277 23
Chester-Goshen.....	156	Chester and Goshen.....	Orange.....	217 86
River.....	193	Bethlehem.....	Albany.....	82 50
Sand Lake-Troy.....	194	Sand Lake and Poestenkill.....	Rensselaer.....	115 97
Wynantskill-West Sand Lake.....	195	Sand Lake, Poestenkill and North Greenbush.....	Rensselaer.....	44 00
East Nassau.....	196	Nassau.....	Rensselaer.....	66 75
Brick Church-Rock Hollow.....	197	Brunswick.....	Rensselaer.....	97 58
Boston-Albany.....	202	East Greenbush and Schodack.....	Rensselaer.....	946 18
Grand Gorge.....	217	Roxbury.....	Delaware.....	58 30
Richfield Springs-Cherry Valley.....	219	Richfield Springs.....	Otsego.....	19 51
Worcester.....	220	Worcester.....	Otsego.....	326 99

Engineering expenses, Division and Residency offices..... \$121 41
 Implements, tools, apparatus and appliances..... 727 05

\$20,591 58

"Money System" Repairs of Highways.

Chapter 700, Laws of 1905; Chapter 686, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Frank D. Lyon.....	Special examiner of highways.....	\$8 00 per day	\$2,496 00		\$2,496 00
Geo. Schildner.....	Engineering draftsman.....	5 00 per day	85 00		85 00
Jesse C. Patrick.....	Inspector of highways.....	4 50 per day	40 50	\$19 18	59 68
Chas. B. Perry.....	Supervisor highways.....	5 00 per day	1,265 00	990 52	2,164 52
Ira P. Cribb.....	Supervisor highways.....	5 00 per day	1,155 00	722 00	1,877 00
Chas. F. Chamberlain.....	Supervisor highways.....	5 00 per day	480 00	386 42	736 42
E. M. Howland.....	Auditor of highway accounts.....	3 50 per day	906 34	85 94	994 28
John Gick.....	Auditor of highway accounts.....	3 50 per day	458 50	283 97	842 47
Valentina Brother.....	Stenographer.....	75 00 per month	417 01		417 01
Elsie Jean Lake.....	Temp. stenographer.....	75 00 per month	65 32		65 32
Phoebe Smith.....	Temp. stenographer.....	60 00 per month	8 00		8 00
Austin Clare.....	Laborer.....	2 00 per day	446 00		446 00
G. H. Shufelt.....	Laborer.....	2 00 per day	8 00		8 00
A. W. Brayton.....	Laborer.....	2 00 per day	262 00		262 00
W. R. Abbey.....	Laborer.....	2 00 per day	6 00		6 00
G. J. Duggan.....	Laborer.....	2 00 per day	32 00		32 00
Geo. Ballentine.....	Laborer.....	2 00 per day	32 00		32 00
Frank Bond.....	Laborer.....	2 00 per day	32 00		32 00
W. S. Schneider.....	Laborer.....	2 00 per day	106 00		106 00
R. A. Hall.....	Laborer.....	2 00 per day	118 00		118 00
C. A. Hulbert.....	Laborer.....	2 00 per day	32 00		32 00
R. C. Dinegar.....	Laborer.....	2 00 per day	22 00		22 00
C. H. Wright.....	Laborer.....	2 00 per day	24 00		24 00
<i>Incidental Expenses.</i>			\$8,498 67	\$2,416 13	\$10,914 80
Stationery and printing.....				\$291 68	
Livery.....				657 75	
Postage.....				1,289 73	
Telephone and telegraph.....				92 57	
Miscellaneous.....				478 24	
					2,809 97
Total.....					\$13,724 77

Survey St. Lawrence County Line.

Chapter 730, Laws of 1904.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
C. H. Flanigan.....	First resident engineer.....	\$225 per month		\$47 45	\$47 45
Dallas Cheney.....	Guide.....	5 00 per day	\$65 00		65 00
<i>Incidental Expenses.</i>			\$65 00	\$47 45	\$112 45
Livery.....				\$11 50	
Telephone.....				50	
					12 00
Total.....					\$124 45

Surveys for State Court of Claims.

Chapter 700, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
John A. O'Connor.....	Assistant engineer.....	\$6 00 per day	\$502 00	\$180 99	\$682 99
George A. Hool.....	Leveler.....	4 50 per day	130 50		130 50
Walter G. Craig.....	Leveler.....	4 50 per day	70 50	4 36	74 86
W. A. Wait.....	Inspector, public works.....	4 00 per day	4 00	3 45	7 45
Geo. Blauvelt.....	Laborer.....	2 00 per day	6 00		6 00
R. P. Campfield.....	Laborer.....	2 00 per day	6 00		6 00
E. B. Munick	Laborer.....	2 00 per day	44 00		44 00
H. G. Stuts.....	Laborer.....	2 00 per day	54 00		54 00
			\$817 00	\$188 80	\$1,005 80
<i>Incidental Expenses.</i>					
Livery.....				\$38 00	
Telephone.....				60	
Miscellaneous.....				2 80	
					41 40
Total.....					\$1,047 20

Topographic Survey.

Chapter 686, Laws of 1906.

In Co-operation with United States Geological Survey.

Aitken, Richard A.	\$200 00
Boyce, Mrs. S. G.	28 38
Brandow Printing Co.	134 20
Butterfield, Sidney	3 36
Clark, Geo. A.	66 00
Cooke, Chas. E.	779 72
Chase, F. T.	133 00
Chant, Henry C.	24 17
Coony, P. H.	28 20
Director U. S. Geological Survey	48 12
Dimmick, G. M.	325 86
Dykeman, F. A.	272 50
Dodge, H. L.	223 00
Eastwood, E. M.	332 33
Everitt, J. E.	136 00
Fields, H.	25 00
Greene, W. E.	159 50
Graft, Fred, Jr.	554 44
Hafley, Carlos G.	287 58
Hamilton, E. P.	160 50
Hayford, F. J.	48 00
Jennings, J. H.	54 58
Munroe, Hersey	111 39
Mathews, Geo. B.	27 50
Porter, C. F.	62 00
Smith, Wm.	258 72
Sheldon, Gracey E.	22 19
Tufts, Wm. O.	973 66
Wilson, H. M.	100 00
Willmarth, H. A.	215 64
Wayne, Mrs. H. L.	12 00
Walker, Nelson	115 68
Wait, J. M.	56 50
Young, Gilbert	297 05
Young, W. D.	67 59
	<hr/>
	\$6,344 36

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1. Erie canal, chapter 699, Laws of 1905.....	\$8,005 05
2. Champlain canal, chapter 699, Laws of 1905.....	3,994 95

Construction of Barge Canal.

3. Head office account, chapter 147, Laws of 1903; chapter 143, Laws of 1905.....	161,864 97
4. Erie canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905.....	84,134 66
5. Champlain canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905.....	32,864 97

Improvement of Public Highways.

6. Improvement of public highways, chapter 115, Laws of 1898.....	128,448 73
7. Maintenance and repairs of improved public highways, chapter 115, Laws of 1898; chapter 468, Laws of 1906; chapter 686, Laws of 1906.....	20,591 58
8. "Money system" repairs of highways, chapter 700, Laws of 1905; chapter 686, Laws of 1906.....	13,724 77

Special Surveys, Etc.

9. Survey St. Lawrence county line, chapter 730, Laws of 1904.....	124 45
10. Surveys for State Court of Claims, chapter 700, Laws of 1905.....	1,047 20
11. Topographic survey, chapter 686, Laws of 1906.....	6,344 36
Total.....	\$461,145 69

TABLE OF CONTRACTS COMPLETED ON THE EASTERN DIVISION DURING THE FISCAL YEAR ENDING SEPTEMBER 30, 1906.

Improvement of Public Highways.
Chapter 115, Laws of 1898.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
John H. Kahrs Board of Supervisors of Orange county.	Oct. 5, 1905	Pines Bridge-Yorktown Heights road, No. 148-A, Westchester county.	\$635 00	\$635 00
Board of Supervisors of Orange county.	June 24, 1903	Newburgh-Campbell Hall road, No. 153, Orange county.	64,450 00	86,816 67
Robert Shafer Albany Material and Con- struction Co.	June 24, 1903	Chester-Vail's Gate road, No. 154, Orange county.	50,425 00	51,837 20
Jeremiah T. Finch The Buckley Construction Company	July 26, 1904	Albany-Schenectady road, No. 176, Albany county.	20,612 83	21,447 00
Seeth Walker Jeremiah T. Finch	June 9, 1904	Scholarie (sections 1 and 2) road, No. 177, Albany county.	38,749 00	42,721 55
Seeth Walker Jeremiah T. Finch	June 8, 1904	Delaware Turnpike (section 3) road, No. 178, Albany county.	74,985 00	85,886 28
Seeth Walker Jeremiah T. Finch	June 17, 1904	Schenectady-Albany road, No. 179, Schenectady county.	25,690 00	28,510 67
Seeth Walker Jeremiah T. Finch	June 9, 1904	Beaver Dam road, No. 192, Albany county.	28,700 00	35,867 04
Seeth Walker Jeremiah T. Finch	June 11, 1904	River road, No. 193, Albany county.	67,903 00	69,055 56
Thomas H. Karr Michael F. Dollard	May 29, 1906	River road, No. 193-A, Albany county.	4,800 00	5,898 60
Michael F. Dollard The Scofield Co.	June 23, 1904	East Nassau road, No. 196, Rensselaer county.	14,670 00	14,252 30
The Scofield Co. James E. Martin	June 9, 1904	Delaware Turnpike (section 4) road, No. 198, Albany county.	59,742 00	66,967 87
James E. Martin	June 9, 1904	Delaware Turnpike (section 5) road, No. 199, Albany county.	49,900 00	61,070 47
	June 23, 1904	Boston and Albany road, No. 202, Rensselaer county.	45,980 00	51,264 27
	April 30, 1906	Boston and Albany road, No. 202-A, Rensselaer county.	555 00	600 00
	July 20, 1904	South road, No. 223, Dutchess county.	39,903 00	44,301 79

TABLE OF CONTRACTS PENDING ON THE EASTERN DIVISION, SEPTEMBER 30, 1906.
Construction of Barge Canal.
 Chapter 147. Laws of 1903.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
Empire Engineering Co.	April 18, 1905	Contract No. 1 (River line) Champlain canal. For excavating the river channel from Northumberland to Fort Miller, and from Crocker's Reef to Fort Edward, the construction of Crocker's Reef dam, the approaches to the head and foot of the Land Line, and other incidental work. Station 9+52 to Station 147+75 and Station 262 to Station 497+35; length, 7.075 miles.	\$712,823 00	\$605,008 40	\$30,420 00
Ferguson Contracting Co.	April 3, 1905	Contract No. 2, Erie canal. For the excavation and protection of the sites of the canal from the Mohawk river to a point about one-fourth mile west of the head of Lock No. 3, the construction of Locks Nos. 2 and 3, with the approaches and appurtenant parts.	1,176,036 00	852,330 00	145,710 00
John W. Flynn.	May 15, 1905	Contract No. 2 A, Erie canal. For the removal of certain dwellings, barns, stables, shops, out-houses and other structures, their foundations and other accessories, the cleaning out of all culverts and cesspools and disposal of their contents from the site of contract No. 2 (except the "Bush" property).	4,810 00	7,550 00	
John W. Flynn.	May 15, 1905	Contract No. 2-B, Erie canal. For the removal of the buildings, with their foundations and other accessories, upon the "Mrs. Bush" property upon the site of contract No. 2, and the cleaning out of all vaults and cesspools and disposal of their contents.	1,290 00	1,005 00	
Sundstrom & Stratton.	April 4, 1905	Contract No. 3 (Land Line), Champlain canal. For the excavation of the canal and the protection of its banks from Station 147+75, below Fort Miller Lock (No. 6) and its approaches, the guard gate and its approaches, the bridge abutments and foundations at Stations 151+60, 173+18, 213+46 and 247+50; the removal and re-erection of the present bridge at East street; the change in location of the old Champlain canal and all other incidental work.	874,662 00	670,497 00	197,694 00
Sundstrom & Stratton.	Oct. 3, 1905	Contract No. 3-A, Champlain canal. For the removal of certain dwellings, barns, stables, shops, out-houses and other structures, their foundations and other accessories, the cleaning out of all vaults and cesspools and disposal of their contents, building foundations, for moving house to Parcel No. 148, for excavating cellar and for moving school house on Parcel No. 141, on the site on contract No. 3.	4,255 00	1,615 00	

Groton Bridge Co.	Aug. 10, 1906	Contract No. 7, *Erie canal (sections 1, 5, 7 and 9). Champlain canal (Section 2). For furnishing and erecting in place steel highway bridge superstructures as follows: On contract No. 2—Erie Canal, Section 1. On contract No. 3—Champlain canal, Section 2. Bridge at Ft. Miller, Station 151+84.54. Bridge at Ridge road, Station 173+18. Payne's Bridge, Station 213+10. On contract No. 4—Erie canal, Section 5. Bridge at Station 6773. Bridge at Station 6886+43.5. Bridge at Sylvan Beach, Station 6939+40. On contract No. 5—Erie canal, Section 7. Bridge at Mosquito Point, Station 5077+76. On contract No. 6—Erie canal, Section 9. Buffalo road bridge, Station 2576+14. Lycell road bridge, Station 2631+38. Lee road bridge, Station 2661+64. Spier's road bridge, Station 2729+10.	117,441 10	97,635 20	.....
Pittsburg Eastern Co.	May 22, 1906	Contract No. 8, Erie canal. For the construction of the following structures on the Mohawk river: Dam 4, Lock 8 at Scotia, Station 1408+86. Dam 5, Lock 9 at Rotterdam, Station 1662+45. Dam 6, Lock 10 at Cranes Village, Station 1987+79 and incidental work appertaining thereto. Length of canal included within the limits of these locks and their approaches 0.7 mile. Contract No. 11, Erie canal. For excavating the canal and protecting its sides from Station 220+00 (0.4 mile north-west of the Delaware and Hudson R. R. crossing at Waterford) to Station 305+00 on the Mohawk river (about 1.6 miles below Crescent). Including the construction of Locks 4, 5 and 6 and appertaining structures a highway, masonry for a guard-gate, bridge abutments and other incidental details. Length of contract, 1.6 miles. Contract No. 15, Champlain canal. For excavating the canal and protecting its sides and constructing Lock No. 11, Dam No. 4, and Lock No. 12, Dam No. 5, and appertaining structures, a spillway, a highway, two masonry culverts, five bridges with their piers and abutments and other incidental details between Lake Champlain at Whitehall, Station 0+73, and Station 356 on Wood creek, about 0.6 mile north of Constock's P. O. Length of contract 6.8 miles. Contract No. 34, Erie canal. For furnishing and erecting in place a steel highway bridge superstructure over the Erie canal at Saratoga avenue, Waterford.	1,746,140 00	1,433,817 00	.....
Fort Orange Const. Co.	May 21, 1906	Contract No. 11, Erie canal. For excavating the canal and protecting its sides from Station 220+00 (0.4 mile north-west of the Delaware and Hudson R. R. crossing at Waterford) to Station 305+00 on the Mohawk river (about 1.6 miles below Crescent). Including the construction of Locks 4, 5 and 6 and appertaining structures a highway, masonry for a guard-gate, bridge abutments and other incidental details. Length of contract, 1.6 miles. Contract No. 15, Champlain canal. For excavating the canal and protecting its sides and constructing Lock No. 11, Dam No. 4, and Lock No. 12, Dam No. 5, and appertaining structures, a spillway, a highway, two masonry culverts, five bridges with their piers and abutments and other incidental details between Lake Champlain at Whitehall, Station 0+73, and Station 356 on Wood creek, about 0.6 mile north of Constock's P. O. Length of contract 6.8 miles. Contract No. 34, Erie canal. For furnishing and erecting in place a steel highway bridge superstructure over the Erie canal at Saratoga avenue, Waterford.	1,922,092 75	1,359,475 00	1,440 00
Atlantic, Gulf & Pacific Co.	Aug. 9, 1906	Contract No. 15, Champlain canal. For excavating the canal and protecting its sides and constructing Lock No. 11, Dam No. 4, and Lock No. 12, Dam No. 5, and appertaining structures, a spillway, a highway, two masonry culverts, five bridges with their piers and abutments and other incidental details between Lake Champlain at Whitehall, Station 0+73, and Station 356 on Wood creek, about 0.6 mile north of Constock's P. O. Length of contract 6.8 miles. Contract No. 34, Erie canal. For furnishing and erecting in place a steel highway bridge superstructure over the Erie canal at Saratoga avenue, Waterford.	1,587,874 00	1,516,960 00	.....
M. Fitzgerald.	Aug. 8, 1906	Contract No. 34, Erie canal. For furnishing and erecting in place a steel highway bridge superstructure over the Erie canal at Saratoga avenue, Waterford.	22,604 00	20,611 50	.....

*Contract No. 7 includes work on Eastern, Middle and Western Divisions.

TABLE OF CONTRACTS PENDING ON THE EASTERN DIVISION, SEPTEMBER 30, 1906 — (Continued).

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
Ganung & Hoyt.....	June 19, 1903	Turk Hill-Putnam county line road, No. 151, Westchester county.	\$70,650 00	\$51,200 00	\$43,035 75
Orange Co. Road Const. Co.	July 20, 1906	Woodbury-Central Valley road, No. 157, Orange county.	24,330 00	18,367 80	5,397 93
Alonzo Schaupp.....	Sept. 1, 1906	Norhampton road, No. 158, Montgomery county.	7,665 00	6,590 00	.....
Orange Co. Road Const. Co.	June 18, 1904	State Hill-Unionville road, No. 160, Orange county.	52,000 00	45,200 00	.....
Orange Co. Road Const. Co.	June 18, 1904	Newburgh-Shawangunk road, No. 161, Orange county.	54,120 00	48,250 00	39,734 77
Thomas H. Karr.....	June 23, 1904	Wynantskill-West Sand Lake road, No. 195, Rensselaer county.	39,400 00	33,400 00	27,657 00
William H. Masterson.....	June 13, 1904	Troy-Postentkill road, No. 201, Rensselaer county.	33,450 00	26,694 12	19,669 27
Corliss Construction Co.	July 9, 1906	Brunswick-Turnpike road, No. 227, Rensselaer county.	30,700 00	25,900 00	4,428 90
John E. Conslaus.....	June 29, 1906	Saugerties-Kingston road, No. 228, Ulster county.	55,700 00	40,800 00	8,191 80
Joseph Walker.....	July 11, 1906	Saugerties-Ellenville (section 1) road, No. 230, Ulster county.	88,200 00	63,439 00	.....
McNamee & Rice.....	July 7, 1906	Post (section 1) road, No. 231, Ulster county.	71,100 00	52,250 00	3,030 75
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Old State road, No. 232, Essex county.	21,700 00	18,000 00	7,290 00
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Frankfort-East Schuyler road, No. 233, Herkimer county.	14,300 00	12,700 00	1,257 30
Morris Kantrowitz.....	Aug. 30, 1906	Delhi-Middletown road, No. 239, Delaware county.	53,300 00	46,775 00	.....
John W. Flynn.....	July 3, 1906	Cohoes-Waterford road, No. 240, Saratoga county.	24,432 41	21,138 40	10,653 75
Schenectady Contracting Co.	July 13, 1906	Saratoga-Ballston road, No. 241, Saratoga county.	40,370 00	30,669 00	.....
Saratoga Trap Rock Co....	July 13, 1906	Saratoga-Glens Falls (section 2) road, No. 242, Saratoga county.	9,820 00	8,513 40	.....
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Mechanicville-Stillwater road, No. 243, Saratoga county.	21,300 00	18,000 00	324 00
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Saratoga-Schuyler road, No. 244, Saratoga county.	59,550 00	55,000 00	3,096 00
Robert Shafer.....	July 12, 1906	Gloversville-Macco-Phelps road, No. 246, Fulton county.	21,000 00	17,203 07	928 96
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Johnstown-Keck's Center (section 2) road, No. 247, Fulton county.	47,100 00	40,000 00	.....
Schenectady Contracting Co.	Sept. 1, 1906	Gloversville-Broadalbin road, No. 248, Fulton county.	22,300 00	16,243 00	.....
The Buckley Construction Co.	July 6, 1906	Old Plank road, No. 249, Fulton county.	28,000 00	24,800 00	5,356 80

The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Plattsburg-Keesville (section 3) road, No. 258, Clinton county	56,700 00	36,000 00	.....	.....
The Buckley Construction Co.	July 6, 1906	Plattsburg-Monroe (section 2) road, No. 259, Clinton county	75,170 00	55,894 00	5,030 46	.....
The Buckley Construction Co.	Aug. 1, 1906	Plattsburg-Moore's (section 3) road, No. 260, Clinton county	43,660 00	33,000 00	297 00	.....
The Scofield Co.	July 6, 1906	Peekskill-Salem Center (section 1) road, No. 261, Westchester county	50,150 00	43,233 00	.....	.....
The Scofield Co.	July 6, 1906	Peekskill-Salem Center (section 2) road, No. 262, Westchester county	41,250 00	33,711 00	3,944 19	.....
Andrews Brothers	July 10, 1906	Birch Hill road, No. 270, Nassau county	14,950 00	10,172 69	4,234 02	.....
Robert Shafer	July 12, 1906	Lake Pleasant-Spectator road, No. 277, Hamilton county	33,900 00	24,443 40	439 98	.....
Degraff & Hogeboom	Aug. 30, 1906	Greenville-Slate Hill road, No. 282, Orange county	65,900 00	56,865 00	.....	.....
Orange Co. Road Const. Co.	Sept. 4, 1906	Greenville-Port Jervis road, No. 283, Orange county	72,000 00	57,350 00	.....	.....
Martin Murray	July 2, 1906	Averill Park-Crooked Lake road, No. 284, Rensselaer county	37,440 00	27,660 00	1,493 64	.....
Thomas H. Karr	July 7, 1906	Nassau-Bradford road, No. 285, Rensselaer county	34,900 00	31,500 00	3,402 00	.....
Morris Kantrowitz	Aug. 30, 1906	Rensselaer-Best road, No. 287, Rensselaer county	43,700 00	35,349 00	.....	.....
John H. Gordon	July 3, 1906	Troy-Sand Lake (section 2) road, No. 288, Rensselaer county	20,800 00	14,500 00	5,111 10	.....
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Amsterdam-Hagaman road, No. 298, Montgomery county	19,400 00	15,000 00	.....	.....
Joseph Walker	July 11, 1906	Saulwater's Corners-Young's Corners road, No. 299, Montgomery county	29,100 00	27,000 00	.....	.....
Joseph Walker	July 11, 1906	De Graff's Corners-Sherburne's Corners road, No. 300, Montgomery county	10,200 00	9,800 00	3,439 80	.....
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Minarville-Scotch Bush road, No. 301, Montgomery county	20,900 00	15,000 00	2,025 00	.....
D. I. Snell & Co.	July 9, 1906	Fonda-Berryville road, No. 302, Montgomery county	16,300 00	14,320 00	2,577 60	.....
Town of Rochester	July 3, 1906	Kingston-Ellenville (section 2) road, No. 305, Ulster county	71,725 00	56,500 00	508 50	.....
Orange Co. Road Const. Co.	Sept. 4, 1906	Middletown-Cuddebackville (section 1) road, No. 312, Orange county	42,100 00	36,450 00	.....	.....
S. B. Van Wagonen	June 30, 1906	Gilbertsville-Mt. Upton road, No. 314, Otsego county	46,900 00	37,000 00	.....	.....
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	Morris-Gilbertsville (section 1) road, No. 315, Otsego county	32,700 00	26,000 00	1,872 00	.....
Silver & Gould	July 10, 1906	Colliersville-Emmons road, No. 316, Otsego county	13,100 00	10,716 00	4,030 65	.....
Silver & Gould	July 10, 1906	Shady Side-Otsego road, No. 317, Otsego county	26,200 00	19,967 75	.....	.....
S. B. Van Wagonen	June 30, 1906	Colliersville-Milford Center road, No. 318, Otsego county	20,700 00	16,500 00	7,873 00	.....
S. B. Van Wagonen	June 30, 1906	Schenewis-Maryland road, No. 319, Otsego county	41,300 00	34,400 00	12,023 28	.....
Orange Co. Road Const. Co.	July 20, 1906	Peekskill-Salem Center (section 3) road, No. 331, Westchester county	47,800 00	42,000 00	12,023 28	.....
Orange Co. Road Const. Co.	July 20, 1906	Peekskill-Salem Center (section 4) road, No. 332, Westchester county	39,650 00	34,690 00	.....	.....

TABLE OF CONTRACTS PENDING ON THE EASTERN DIVISION, SEPTEMBER 30, 1906 — (Concluded).
Improvement of Public Highways—(Concluded).

CONTRACTOR.	Date of contract.	Character of Work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
Buckley Construction Co.	July 6, 1906	Saratoga-Corinth road, No. 340, Saratoga county.	\$63,500 00	\$51,000 00	
John W. Polcaro	July 6, 1906	Stockport-Hudson road, No. 341, Columbia county.	30,150 00	23,100 00	\$4,781 70
The General Construction Co.	Aug. 28, 1906	Chatham-Chatham Center road, No. 342, Columbia county.	8,700 00	7,500 00	
The Lane Const. Corp'n.	July 7, 1906	Pawling-Patterson road, No. 343, Dutchess county.	24,350 00	21,915 00	1,183 41
Charles R. Lewis	July 9, 1906	Middletown-North East Center road, No. 344, Dutchess county.	19,950 00	16,000 00	3,312 00
Alonzo Schuapp	July 10, 1906	Frankfort-Ulrica (section 2) road, No. 359, Herkimer county.	18,700 00	14,600 00	1,182 00
Ulysses G. Stockwell	July 2, 1906	Poland-Cold Brook road, No. 360, Herkimer county.	4,150 00	3,740 00	3,373 72
	July 9, 1906	Johnstown-Tribes Hill (section 1) road, No. 361, Fulton county.			
Robert Shafer	July 12, 1906	Preston Hollow-Potter Hollow road, No. 364, Albany county.	24,000 00	20,149 00	7,072 30
James H. Malcom	July 3, 1906	Guilderland Center-Guilderland road, No. 365, Albany county.	27,400 00	24,036 50	1,730 63
Joseph Walker	July 11, 1906	New Scotland-Wolf Hill road, No. 366, Albany county.	17,900 00	14,088 14	3,803 80
The Buckley Construction Co.	July 10, 1906	Glenmont-Feura Bush road, No. 367, Albany county.	88,900 00	58,500 00	20,533 50
Casey & Murray	July 6, 1906	Glenmont-Feura Bush road, No. 367, Albany county.	62,750 00	48,460 00	14,660 51
Casey & Murray	July 10, 1906	Glens Falls-Lake George road, No. 417, Warren county.	84,700 00	72,500 00	18,270 00
Lawlor & Haines	July 10, 1906	Lake George-Bolton Landing road, No. 418, Warren county.	108,875 00	82,500 00	
The Buckley Construction Co.	Aug. 31, 1906	Rhinebeck-Hyde Park road, No. 432, Dutchess county.	37,725 00	00,968 00	
	Sept. 1, 1906	Chazy-Chazy Landing-Ober's Corners road, No. 433, Clinton county.			
Andrews Brothers	July 10, 1906	Arrandale-Bay View road, No. 434, Nassau county.	38,925 00	33,980 00	
Peace Brothers	Sept. 1, 1906	South Glenwood-Meeting House road, No. 435, Nassau county.	15,800 00	11,026 26	396 95
Jeremiah T. Finch	Sept. 1, 1906	Jericho Turnpike-Plainview road, No. 436, Nassau county.	21,000 00	17,500 00	630 00
The Clinton Beckwith Engineering & Contracting Co.	Aug. 31, 1906	Saratoga-Glens Falls (sections 4 and 5) road, No. 441, Saratoga county.	80,950 00	56,000 00	
McNamee & Rice	July 10, 1906	Poughkeepsie-Hyde Park road, No. 453, Dutchess county.	74,700 00	59,987 00	
Ulysses G. Stockwell	July 9, 1906	Little Falls-East Creek road, No. 456, Herkimer county.	52,450 00	38,000 00	
Sylvester A. Seymour	July 9, 1906	Little Falls-Herkimer road, No. 457, Herkimer county.	61,500 00	48,949 00	881 08
John H. Nelson & Co.	July 10, 1906	Herkimer-Frankfort road, No. 458, Herkimer county.	65,700 00	55,950 00	3,524 85
The Clinton Beckwith Engineering & Contracting Co.	July 9, 1906	East Schuyler-Deerfield road, No. 459, Herkimer county.	38,925 00	31,367 00	1,809 02
John H. Nelson & Co.	July 10, 1906	Herkimer-Middleville road, No. 460, Herkimer county.	62,300 00	56,000 00	2,520 00
The Clinton Beckwith Engineering & Contracting Co.	Aug. 31, 1906	Ausable Forks-Clintonville road, No. 476, Clinton county.	72,515 00	62,325 93	
			56,150 00	44,649 00	

The Lane Construction Co.	July 9, 1906	Northeast Center-Sharon Station road, No. 534, Dutchess county.	37,100 00	31,600 00	
General Construction Co.	July 7, 1906	Amenia-Wassala road, No. 537, Dutchess county.	45,500 00	39,960 00	
John W. Polcaro.	July 6, 1906	Chatham-Shencertown road, No. 540, Columbia county.	23,500 00	19,200 00	1,382 40
James E. Martin.	July 5, 1906	Poughkeepsie-Pleasant Valley road, No. 549, Dutchess county.	60,450 00	52,496 00	1,889 86
Hinman & Spraul.	Aug. 28, 1906	Violet Avenue-East Park road, No. 550, Dutchess county.	18,100 00	14,999 00	
McNamee & Rice.	July 10, 1906	Fishkill-Hughsonville road, No. 551, Dutchess county.	25,700 00	22,000 00	4,544 00
Joseph Walker.	July 11, 1906	Baldwin Place-Mahopac road, No. 569, Putnam county.	51,500 00	44,000 00	3,960 00
Jeremiah T. Finch.	July 9, 1906	Schenectady-Guilderland road, No. 577, Schenectady county.	58,200 00	48,287 00	19,583 23
Harry S. Williams.	Sept. 1, 1906	Nevis-Blue Store road, No. 589, Columbia county.	28,600 00	24,987 00	
County of Rockland.	Sept. 13, 1906	Highland Lake-Tompkins Cove road, No. 593, Rockland county.	105,650 00	105,585 00	

Maintenance and Repairs of Improved Public Highways.

Chapter 488, Laws of 1906; Chapter 686, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of Work.	Contract price.	Payments to September 30, 1906.
Joseph Walker.	July 20, 1906	Contract No. 1—Roads Nos. 11, 26 and 102, in the county of Rensselaer.	\$2,084 00	
The Orange County Road Construction Co.	Sept. 1, 1906	Contract No. 17—Roads Nos. 42, 43, 44, 45, 46, 64, 65, 93, 95, 113, 114, 115, 153 and 159, in the county of Orange.	Unit prices.	
James Duell.	Aug. 25, 1906	Contract No. 18—Roads Nos. 52 and 53, in the county of Westchester.	9,309 00	

REPORT
OF THE
DIVISION ENGINEER
OF THE
MIDDLE DIVISION

For the Fiscal Year Ending September 30, 1906.

MIDDLE DIVISION.

STATE OF NEW YORK,
DEPARTMENT OF STATE ENGINEER AND SURVEYOR,
MIDDLE DIVISION.

SYRACUSE, N. Y., *October 1, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor,*
Albany, N. Y.:

Dear Sir.— I transmit herewith the annual report showing work accomplished on the Middle Division for the fiscal year ending September 30, 1906.

CANALS AND SPECIAL APPROPRIATIONS.

The canal systems of the Division have not been changed in any particular. No interruptions of navigation have occurred during the year, and but one break of importance, and that at Forestport on the feeder to the Black River canal.

About 3 o'clock, P. M., on Tuesday, the 13th day of March, Mr. Charles Barrett, Assistant to the Superintendent of Canals on the Middle Division, reported that on the day above stated, at precisely 8 o'clock, A. M., the bank which is composed principally of sand, on the north side of the canal just north of the town of Boonville, had gone out and an aperture washed away about 65 feet at the base and 125 feet at the top made. The accident occurred practically at the same place as that occurring in 1902.

This Department was called upon for advice, and, after consulting with the Deputy State Engineer, the writer visited the site and devised a plan of building a concrete core wall parallel with the canal and extending well back into the firm banks on either side, the toe of the slope to be well braced with piles and cribs filled with stone. This plan proved very satisfactory. The work

was progressed and completed during the month of May. It was also decided to fill in the low ground on the south side up to the height of canal bottom.

The material through which the feeder passes is a very excellent quality of building sand and has heretofore been troublesome to hold permanently in place. The slightest break in the surface causes it to run, and where it reaches the water line, quickly washes the bank and endangers the entire canal prism.

ASSEMBLY REPORTS.

During the year we have reported upon the following Assembly bills: Nos. 91, 93, 94, 97, 119, 561, 644, 649 and 937.

WORK UNDER SPECIAL APPROPRIATIONS.

High Dam on the Oswego river, Improvements to the Harbor at Canandaigua, Bridge at Cold Spring over the Seneca river, Willow street bridge across the Oswego canal, Willow street, in the city of Syracuse, and alterations to the Weigh-lock building — headquarters of the Division Engineer in the city of Syracuse — the work under special appropriations, have been completed. There remains but the repairs to the Brasher Falls dam, which will be completed by November 15, 1906.

Detailed accounts of contracts completed during the year are herewith appended.

CONTRACTS COMPLETED DURING FISCAL YEAR ENDING SEPTEMBER 30, 1906.

RAISING AND COMPLETING HIGH DAM, OSWEGO RIVER.

(Chapter 645, Laws of 1901; chapter 594, Laws of 1902; chapter 632, Laws of 1904.)

Contractor, Walter Bradley & Co.

Engineer in charge, E. C. Clark.

Appropriation	\$8,692 32
Engineer's estimate	4,677 00
Contract price	4,277 75
Final account	4,414 85

During the years 1901 and 1902 an appropriation was made for the repairs to High dam on the Oswego river. The work embraced in the contract included the raising and completion of the dam.

The contract was awarded to the firm of Walter Bradley & Company, contractors of Fulton, N. Y., and it extended over the years of 1901, 1902, 1903 and 1904 and was completed during the following year of 1905, and final account rendered Nov. 28, 1905.

CONTINUING IMPROVEMENT OF HARBOR, CANANDAIGUA LAKE.

(Chapter 594, Laws of 1902; chapter 729, Laws of 1904; chapter 230, Laws of 1906.)

Contractor, Wm. H. Welch.

Engineer in charge, D. E. Whitford.

Appropriation	\$4,361 46
Engineer's estimate	3,506 00
Contract price	3,598 50
Final account	3,546 48

Improvements designed under this contract were for the purpose of deepening the harbor at the foot of Canandaigua lake in the village of Canandaigua. Contract was awarded to Wm. H. Welch of Canandaigua, N. Y., on the 13th day of Sept. 1904, but, owing to the many delays in obtaining timber, its completion was not accomplished until Sept. 6, 1906.

COLD SPRING BRIDGE, SENECA RIVER (OSWEGO CANAL).

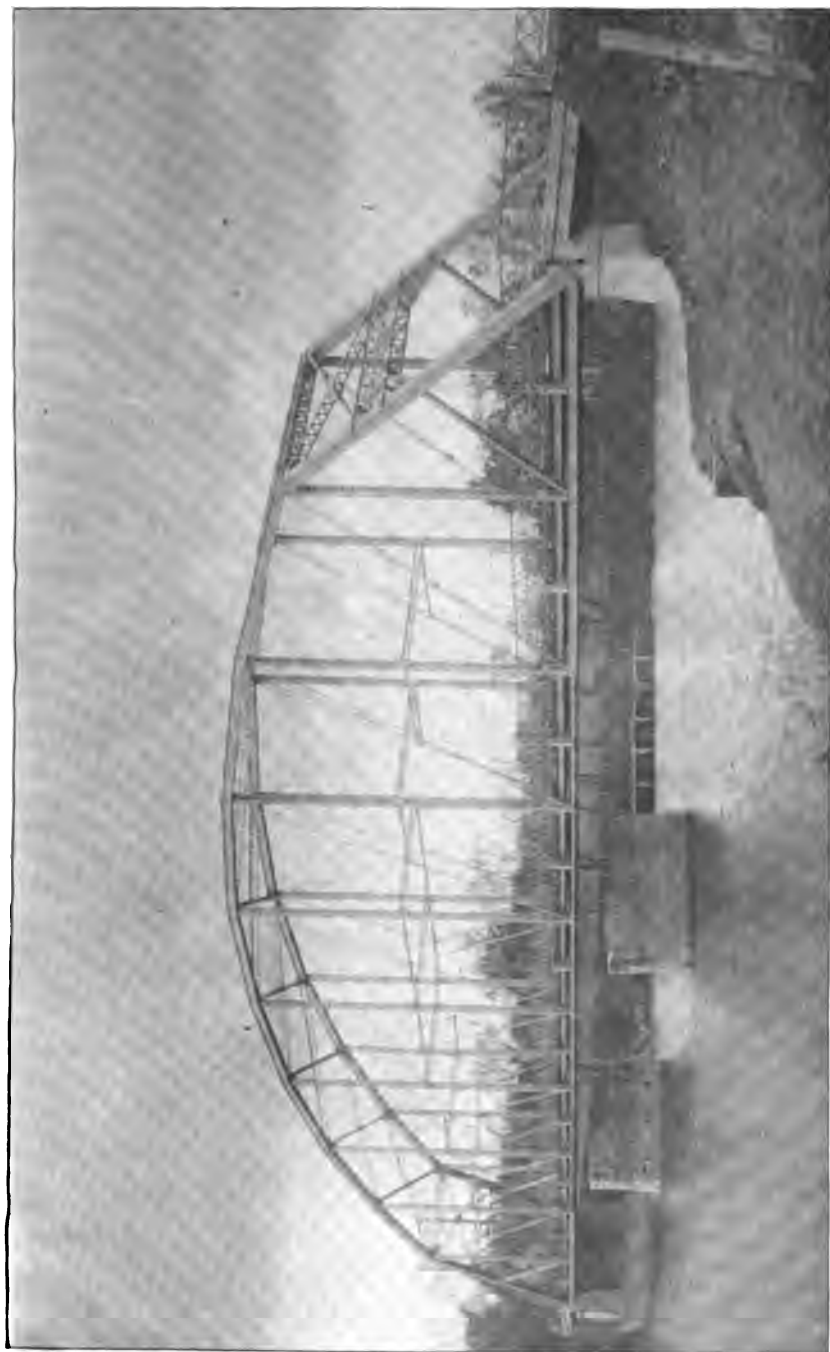
(Chapter 581, Laws of 1903; chapter 172, Laws of 1905.)

Contractor, The King Bridge Co.

Engineer in charge, D. C. Wedgeworth.

Appropriation	\$20,000 00
Engineer's estimate	17,255 00
Contract price	18,431 50
Final account	18,725 25

In order that the contract might be started, the Hon. Allen C. Sabin, Mayor of the city of Syracuse, gave his personal check for the City's portion, and contract for the work was awarded to the



COLD SPRING BRIDGE OVER SENECA RIVER (OSWEGO CANAL).
New style of reinforced concrete abutments and approaches is shown. Old piers subsequently removed.

The residents of the towns of Lysander and Salina have for a number of years petitioned the State for a new bridge at Cold Spring. The State Engineer was requested to make an examination, and as a result of this it was found that the old bridge was in a dangerous condition. The foundations had settled and jeopardized the old structure to such an extent that it was decided to close it to travel.

In order to obtain a new bridge an appropriation was made under chapter 493, Laws of 1904, and a design for a single span, through, riveted bridge was approved. Contracts for its erection were awarded to the King Bridge Company on the 27th day of December, 1904, and work was completed during the year and final account rendered on the 22nd day of December, 1905.

WILLOW STREET BRIDGE OVER THE OSWEGO CANAL, SYRACUSE.

(Chapter 600, Laws of 1903; chapter 172, Laws of 1905.)

Contractor, Rochester Bridge & Construction Co.

Engineer in charge, D. C. Wedgeworth.

Appropriation	\$19,000 00
Engineer's estimate (superstructure)	12,940 00
Contract price	13,259 20
Final account	13,413 85

Willow street, located in the city of Syracuse, is one of the busiest thoroughfares of the city and has been carried over the Oswego canal by an overhead bridge with steep approaches on either side. To overcome this it was decided to build a lift bridge, and under chapter 600, Laws of 1903, an appropriation was made for the purpose, but owing to the failure of a local bank the City's funds were tied up and could not be used until the Receiver's final adjustment.

In order that the contract might be started, the Hon. Allen C. Fobes, Mayor of the city of Syracuse, gave his personal check for the City's portion, and contract for the work was awarded to the



COLD SPRING BRIDGE OVER SENECA RIVER (OSWEGO CANAL).
New style of reinforced concrete abutments and approaches is shown. Old piers subsequently removed.

Rochester Bridge & Construction Company on the 3d day of May, 1905. It was completed and final account rendered on the 7th day of June, 1906.

MAKING ALTERATIONS TO WEIGH-LOCK BUILDING, SYRACUSE.
(Chapter 700, Laws of 1905.)

Contractor, John Young.

Engineer in charge, D. C. Wedgeworth.

Appropriation	\$5,000 00
Engineer's estimate (painting building not included)	4,542 33
Contract price	4,144 70
Final account	4,482 70

The upper floor of the weigh-lock building is occupied by the State Engineer's Department, Middle Division, and is the headquarters of the Division Engineer.

The increased business coming to the office made it necessary to rent additional quarters outside of the building. Difficulty was found in obtaining suitable office quarters for the large force of men employed so that three offices had to be maintained in the city. To reduce the expense and combine the work under one roof, it was decided to endeavor to obtain an appropriation for remodelling that portion of the building occupied by the weigh-lock apparatus. To this end an appropriation was obtained under chapter 700, Laws of 1905, and the contract for remodelling awarded to John Young on the 18th day of January, 1906. The work was completed and final account rendered on the 10th day of June, 1906. The space thus obtained enabled the Division Engineer to move the outside forces, including the Barge canal men, into the building where they are now quartered. The added accommodations thus obtained will probably be adequate for many years to come.

CONTRACTS PENDING SEPTEMBER 30, 1906.**CONSTRUCTING A NEW APRON AND REPAIRING STATE DAM AT BRASHER FALLS.**

(Chapter 729, Laws of 1904; chapter 700, Laws of 1905; chapters 250 and 686, Laws of 1906.)

Contractor, B. P. Clark.

Engineer in charge, David R. Lee.

Engineer's estimate	\$5,038 25
Contract price	5,038 25
Payments to September 30, 1906.....	2,007 00

Repairs to Brasher Falls dam situated on the St. Regis river at Brasher Falls, St. Lawrence county, N. Y.

Owing to the great volume of ice flowing in the St. Regis river, it was alleged early in the year 1903 that the dam recently constructed at Brasher Falls by the State was in danger of failure due to the breaking of the apron timbers and the undermining of the foundation upon which the dam rested. Examination proved the report well founded and estimates were prepared by the Department for the repairs. Under chapter 729, Laws of 1904, a small appropriation was made, but not sufficient to properly execute the work. Again in 1905 an appropriation was also made, and during the last session of the Legislature, 1906, an additional appropriation was made. The delay thus occasioned made it necessary to revise the estimates and plans formerly prepared for its construction. This was done, and the contract finally awarded August 22, 1906, to B. P. Clark of Brasher Falls, St. Lawrence county, N. Y., for \$5,038.25. The work is being prosecuted to final completion under the direction of David R. Lee, Assistant Engineer, and will probably be completed by November 15, 1906.

BARGE CANAL CONTRACT NO. 7 — BRIDGES ON SECTIONS 5 AND 7, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, The Groton Bridge Co.

Engineer's estimate	\$39,883 30
Contract price	38,125 80
Payments to September 30, 1906.....	Nothing



BARGE CANAL, CONTRACT NO. 4.

View looking west from Station 6815, showing piling and sheeting on north side of prism.

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This contract embraces the bridges located on contracts Nos. 4 and 5 at the following stations:

Contract No. 5 at Stations 6773 and 6886+43.5. Sylvan Beach bridge at Station 6939+40. Mosquito Point bridge at Station 5077+76. The entire work was awarded to the Groton Bridge Company on August 1, 1906.

BARGE CANAL CONTRACT NO. 10, OSWEGO CANAL.

(Chapter 147, Laws of 1903.)

Contractors, Mosier and Summers.

Engineer in charge, Edwin Styring.

Engineer's estimate	\$1,149,988 00
Contract price	1,126,718 00
Payments to September 30, 1906.....	1,998 00

Contract No. 10, Oswego Barge canal is the first one thus far awarded on this line and consists in excavating the canal, protecting its sides, constructing locks Nos. 2 and 3, the dams, bulkheads and other incidental details between 0.35 of a mile above the Broadway bridge, and 0.27 of a mile below the Oneida street bridge in the city of Fulton, N. Y. Length of contract, 1.2 miles.

Work was awarded to the firm of Mosier and Summers on the 19th day of January, 1906. On the execution of their contract, work was started and is now well under way.

BARGE CANAL CONTRACT NO. 4, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Empire Engineering Corporation.

Engineer in charge, F. J. Wagner.

Engineer's estimate	\$812,560 00
Contract price	726,815 00
Payments to September 30, 1906.....	37,062 00

Barge canal contract No. 4, begins at the foot of lock No. 25, Station 6715 +, and extends out into the deep water at east end of Oneida lake at Sylvan Beach. Length, 4.83 miles.

This contract was awarded to Linden W. Bates on the 18th day of April, 1905. Work was started during the summer at several points and consisted in building dykes parallel with the center line of the canal preparatory to the use of the large dredging machines that the company was constructing especially for the work of this contract.

BARGE CANAL CONTRACT No. 5, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Empire Engineering Corporation.

Engineer in charge, G. W. Stickney.

Engineer's estimate	\$421,252 50
Contract price	381,987 50
Payments to September 30, 1906.....	10,251 00

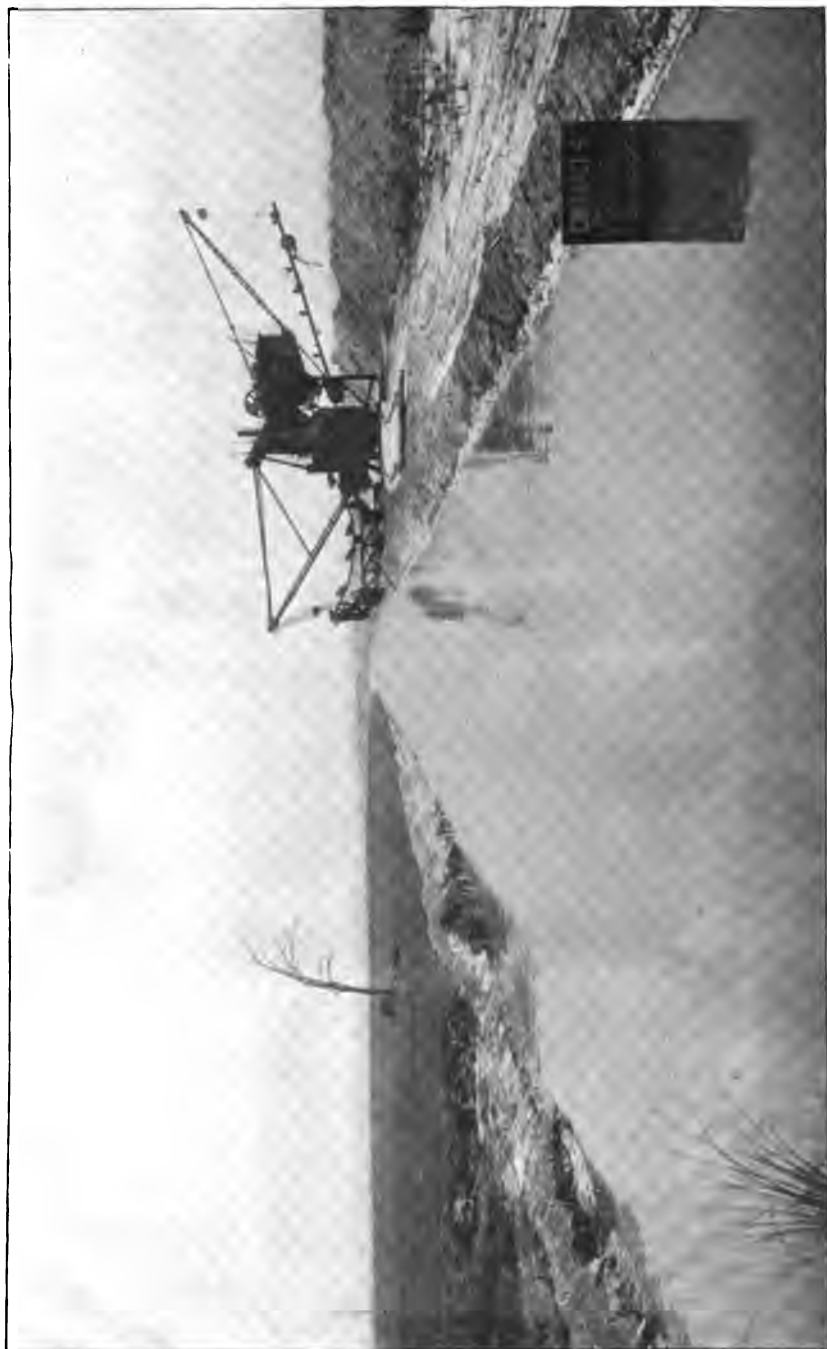
The work embraced in this contract begins at Station 5074, near Mosquito Point bridge over the Seneca river, and extends to Station 5373, the east end of the village of Savannah, a total distance of 5.66 miles.

Contract was awarded on the 18th day of April to Linden W. Bates, who immediately began to erect dykes parallel with the center line of the canal for the purpose of forming bulkheads, behind which it is intended to place the spoil excavated from the river bed by means of hydraulic dredges. Machinery for the work is being constructed and will doubtless be in commission by the latter part of October, 1906.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

The location of the Barge canal crossing the Middle Division has received most careful consideration from the State Engineer and the Advisory Board of Engineers. In a number of places, after experiments had been made, it was decided that the interests of the State would be much advanced by a change of location. This work has been in active prosecution during the year, and at the end of the fiscal year is substantially completed.



BARGE CANAL, CONTRACT NO. 4.
View looking east from Station 6825, showing north ditch excavated by Lubecker machine.

Due consideration has been given to the award of contracts, and very careful inspection exercised. Contracts Nos. 4 and 5, awarded to Linden W. Bates, have been taken over by the Empire Engineering Corporation, who, on assuming the responsibilities attending the prosecution of same, made arrangements for large hydraulic dredges which have during the year been constructed at Sylvan Beach, and Fox Ridge. The one at Sylvan Beach is in active and successful operation, fulfilling all the claims made for it by its designers. On this contract dredging has been carried to the highway crossing leading to the village of Sylvan Beach. The Lubecker dredging machine, introduced on the previous year, is working in advance of the larger machine, material excavated by it being placed in the dykes on either side parallel with the center line of the canal. It is designed to pump the sand through the hydraulic dredges to the spoil banks which are situated in the rear of dykes above referred to. Concrete for the overhead bridges is in place ready for the steel, and work on this contract well advanced.

With the exception of the masonry for the Mosquito Point bridge over the Seneca river at Station 5077 + 76, east of the village of Fox Ridge, very little work has been done on contract No. 5. Several unforeseen accidents to the hydraulic dredge has delayed the work. Repairs have been made and it is expected work will be begun on the first day of November. Material through which the machine is excavating is of sand and some clay and marl.

On the 19th day of June, 1906, contract No. 10 on the Oswego river was let to the firm of Mosier and Sumners, of Buffalo, N. Y. The work embraces the excavation of the canal, and protecting its sides, constructing locks Nos. 2 and 3, the dams, bulkheads and other incidental details above and below the Broadway and Oneida street bridges in the city of Fulton, N. Y. Most careful consideration was given to the selection of a location before contract was awarded. The water rights controlled by the milling interests had to be given due consideration. These properties are situated on the banks of the canal, and in several places extended into the proposed canal prism. This was accomplished after a study of some 21 alternate lines presented to the Advisory Board of Consulting Engineers, who, after weighing the merits of all the

schemes, decided upon the line on which the canal is now being constructed. Contractors began work in September, and work is progressing rapidly. They have constructed a bulkhead at the lower end of the contract, damming the river off. At this point they have located two large steam shovels and are excavating the bed of the river. The engineering forces have been engaged in completing field work for the balance of the line to Oswego. Drawings and contracts are in process of preparation and will be ready to submit to the Advisory Board during the year 1907.

The work on Barge canal Residencies Nos. 6 and 7, sections Nos. 6 and 7, contract No. 5, under the care of Resident Engineer Guy Moulton, has been progressed satisfactorily, the details of which I herewith append under his report. Resident Engineer Moulton reports:

"Section No. 6 extends from deep water in Oneida lake to Baldwinsville, a distance by the Barge canal line of 23.4 miles. From about three-fourths of a mile below Brewerton the alignment has been revised for one and one-half miles, and around all the sharp bends in the Seneca river between Three Rivers and Baldwinsville, sharper curvature being substituted for that originally located. A branch line to Syracuse has been located from a point near Cold Spring bridge, through Onondaga lake, and the necessary measurements, wash-drill tests and topography taken to prepare an estimate on same.

"The plans and estimate from Oneida lake to Three Rivers have been revised in accordance with the changes mentioned, and detailed plans and an estimate of quantities made on the section between Three Rivers and Baldwinsville.

"The work on section 7 has been between Baldwinsville and the beginning of contract No. 5 at Mosquito Point, a distance of 20.9 miles; on contract No. 5, extending from Mosquito Point to Savannah, a distance of 5.66 miles; and from Mays Point to Wayne county line, about 2½ miles. On this latter section a stadia survey has been made.

"Between Baldwinsville and Mosquito Point the necessary surveys, measurements and wash-drill tests have been completed and detailed plans and an estimate of quantities made.



BARGE CANAL, CONTRACT No. 4.
View looking east from Station 6886, showing prism excavated by hydraulic dredge.

"On contract No. 5 dykes have been made where necessary in anticipation of doing the excavating by hydraulic dredge. The dredge has been constructed and work started. One bridge abutment at Mosquito Point has been completed."

The residency under the care of Mr. Emile Low is shown herewith in detail. Resident Engineer Low reports:

"Wood Creek Location, Fort Bull to Tuttle's Farm."

"Contract No. 13. At the beginning of the fiscal year, October 1, 1905, the work of preparing this contract was in progress. This included the survey work, borings and mapping, which were well under way at the date mentioned.

"In order to allow for a future widening of the canal prism, as recommended by the Advisory Board of Consulting Engineers, many of the contract drawings were changed to conform to this recommendation.

"The field work of this contract, which includes the surveys and borings, was practically completed on January 1, 1906.

"The office work was completed early in March, 1906, and the contract drawings, comprising 52 sheets, and the preliminary estimate, comprising 96 sheets, were sent to Albany soon after.

"In the latter part of July, 1906, orders were given to move the center line of the Barge canal, at the western half of this contract, 250 feet to the north. The necessary field work of this change was done during August and September, 1906, the office work keeping pace therewith, and the completed revised drawings and preliminary estimate forwarded to Albany on October 1, 1906.

"The revision of the center line on contract No. 13 affected the eastern end of contract No. 4, the surveys for which work were done at the same time as those on contract No. 13.

"In addition to the above more or less work has been done on the land appropriation maps of these contracts, which also includes valuations of the property to be taken.

" Mohawk River Location, Utica to Rome.

" *Contracts Nos. 30, 42 and 43.* At the beginning of the fiscal year, October 1, 1905, the center line had been run in and staked out on the ground.

" This location followed closely the base of the northern hills of the Mohawk river valley, between the points mentioned.

" The cross-sectioning of this location was completed on October 19, 1905. On the following day the work of monumenting the line was begun, concrete monuments being placed at all important points. Since then situation surveys for the various proposed structures have been made, which include locks, spillways and bridges.

" The location maps, showing center line and profile have been plotted, as also have been the cross-sections and many of the situation surveys.

" Locks Nos. 20 and 21 occur on this section, the former being located west of Utica and the latter opposite Oriskany.

" Borings for these locks as well as for other structures have also been made, and two boring parties are now at work, boring the remainder of the line.

" Rome to Fort Bull Location — Contract No. 44.

" This contract comprises the section through the city of Rome.

" The center line has been run in on the ground, except along the line of the Erie canal, where an offset line has been run.

" All the cross-sections have been taken, as well as the topography, comprising the natural and artificial features.

" Situation surveys for the many proposed structures have been made, and much information relative to buildings, water and gas pipe lines and sewers obtained.

" The location maps, showing center line and profile, have been plotted, and also many of the cross-sections. In addition a number of special maps have been made, showing individual sections of the city of Rome.

" In addition, surveys of the Mohawk river in the vicinity of the State Dam have been made and maps of the same plotted.



BARGE CANAL, CONTRACT NO. 4.

View looking northeast from Station 6888, showing excavation in prism by hydraulic dredge ; also bridge abutment in background.

" Borings of the center line have been made, and also for the many structures occurring in this section, as dams, guard-gates and bridges.

" *Miscellaneous Surveys* have been made of the valleys of Beaver brook, Canada creek, Six-Mile creek, and crossings of Stony brook, Erie canal.

" *Water Gages.* Readings of the water-surface of the Mohawk river, at the various permanent structures over the same, have been taken weekly.

" *Contract No. 4.* Work on this contract was begun September 5, 1905, by the Empire Engineering Corporation, contractor, and has continued since then without interruption.

" The main work to date has been the driving of the bank protection, consisting of pilcs, wales and sheet piling, and the building of two concrete substructures for highway bridges. The excavation done has been mainly ditches and some prism excavation.

" The hydraulic dredge 'Oneida' was completed on October 1, 1906. It is expected that the major portion of the excavation on this contract will be done by this dredge."

Resident Engineer Failing reports:

" The residency field work on the Oswego canal, during the past year has consisted mainly in securing additional information required by the adoption of alternative layouts in the alignment of the proposed canal; additional details as the contract drawings progressed, such as running the revised and approved center lines; cross-sections on same; survey for changes in location of highway, dams, etc.; detail measurements of all structures and buildings, together with survey of each appropriated parcel on contract No. 10. Additional rock boring test pits and rod soundings were made between Three Rivers and Oswego, and the same located.

" The office work has consisted in plotting and tracing the field work on the 50 and 100-foot scale maps; appropriation maps for contract No. 10, and searching titles to same. Cross-sections were plotted, plans and tracings made for contract No. 39. Estimates were made on alternative schemes and calculations for river slopes, etc.

" Construction work commenced on contract No. 10, August 4. Lines were given to locate coffer-dams, excavation, spoil banks, walls and bulkheads. Cross-sections were taken and plotted. Computations were made for the disposal of material and for monthly estimates."

Engineer of Water-supply Holmes reports:

" The work of the Department embraces the preliminary investigations and surveys, and the preparation of plans and estimates for the furnishing of the supply of water necessary for the operation of the Barge canal.

" In connection with the work the greater part of the preliminary investigations have been completed. Surveys have been made for dams and reservoir sites on the Oriskany creek, near Oriskany, on the Mohawk river at Delta, on West Canada creek at Hinckley, and on Limestone creek at High Bridge. Surveys have also been made for the Nine-Mile creek feeder from Trenton falls to the junction with the Barge canal.

" These reservoir sites being at some distance from the canal, it was necessary before beginning the topographic surveys to run precise levels and establish bench marks for connecting our surveys with the same datum as the canal. In general, the topographical surveys have been made by the stadia method and sufficient points located for interpolating and drawing two-foot contours on the maps. In addition, all artificial features, such as highways, property lines, fences, buildings, etc., have been carefully located.

" The nature of the foundation of the dam sites at Oriskany, Delta and Hinckley have been thoroughly investigated by numerous wash-drill and calyx borings in addition to rod soundings and test pits.

" Maps of all of the above mentioned surveys have been prepared and more or less study made of the problems of each of the reservoir sites. Plans and estimates are now under way, and it is the intention to have the contract drawings for a portion of the work ready for letting at an early date.



BARGE CANAL, CONTRACT NO. 4.

View looking north from Station 6901, showing progress of raising New York, Ontario and Western railroad bridge and tracks.



"The following is a statement of the field work completed September 1, 1906:

Topographic surveys	26	square miles.
Transit lines	15	linear miles.
Levels	66.3	linear miles.
Wash-drill borings	11,742	linear feet.
Calyx-drill borings	128	linear feet.
Drive-rod soundings	3,897	linear feet."

COURT OF CLAIMS SURVEYS.

A party was engaged during part of the year in making surveys and plotting accurate maps to be used by the Attorney-General's Department in preparing a defense in the Court of Claims for cases arising from leakage or overflow of the canals and streams passing through or under them.

Surveys were made and maps prepared for 32 claims distributed as follows: Bear Trap creek, 2; Gilly brook, 2; Cowassalon creek, 2; Camillus feeder, 1; Forestport feeder, 1; Ox creek, 1; White Bottom brook, 2; Fish creek, 6; Canastota State ditch, 15.

In addition to these, maps covering 75 claims were prepared from surveys previously made.

On Feb. 19, 1906, a special session of court was held and 16 of these claims brought to trial. The other 91 cases for which maps have been prepared are still awaiting trial. Survey party in charge of L. D. Brownell, Assistant Engineer.

SENECA RIVER AND CAYUGA LAKE SURVEY.

Under chapter 700, Laws of 1905, an appropriation was made for the purpose of making surveys and estimates for the construction of a canal from some point on the proposed Barge canal in or near the Seneca river to Cayuga lake.

The work contemplated under the above law has been completed and a report made including plans and estimates for a canal of 7, 9 and 12-foot depths from a point near Fox Ridge to deep water in Cayuga lake.

In the prosecution of the field work an accurate line of levels was run and benches established at frequent intervals between Fox Ridge and the village of Cayuga using the Barge canal datum. The Ithaca city datum and the U. S. G. S. bench on the Ithaca lighthouse pier were connected with the Cayuga bench by water levels of Cayuga lake, making available the valuable record of lake fluctuations made by Prof. C. L. Crandall of Cornell University.

Accompanying the report is a large map embracing the whole area surveyed, showing all topographic features and surface elevations, and in addition the nature of the subsoil as determined by numerous rod soundings and borings.

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Under chapter 115, Laws of 1898, and chapter 468, Laws of 1906.)

Under the laws for the improvement of public highways many plans, specifications and estimates have been prepared by the engineers of the Middle Division, approved by the Board of Supervisors and placed on the building list. The following table will show the number of miles petitioned for, surveyed, mapped, approved by supervisors, under contract and completed:

	1906.	Total from 1898 to 1906.
Miles petitioned for	406.41	2,518.14
Miles surveyed	246.20	1,067.60
Miles mapped	135.33	580.74
Miles approved by Supervisors.	125.79	469.60
Miles under contract.	143.48	238.11
Miles completed	9.50	80.44

Careful observation of the highways already built shows that the best results have been obtained where section "B" of the standard plans has been used. However, some modifications were found necessary where the road traverses a mountainous section and side-hill excavation is encountered. A ditch of considerably greater area than is shown on the plan was introduced to take care of water coming to the roadside. The inspection in the spring



BARGE CANAL, CONTRACT NO. 4.

View looking north from Station 6939 + 40, showing north and south concrete abutments for Sullivan Beach bridge.

showed that very little ravelling had occurred on roads built after this section. It has an advantage in affording a greater width of travel-way than the old sections with ditches on each side, and enables persons driving fractious horses to pass automobiles and traction engines with a greater degree of safety than formerly.

In addition to the duties heretofore performed by the Division Engineer, the work of maintenance was added. Under chapter 686, Laws of 1906, the sum of \$150,000 was provided for the maintenance of roads previously built under the Higbie-Armstrong act. The portion of this sum due to this division has been spent in the repairs to roads heretofore built, and they have been put in a high state of repair.

I wish to reiterate my former recommendation, and cannot make it too strong, that the interests of the State demand the universal introduction of the Wide Tire Law. I believe if this was enforced, the life of the highways would be increased threefold.

Experiments with oil to lay the dust on macadam roads was tried on the Utica-Paris road near the city of Utica. A tank of 6,043 gallons of Ragland oil was used in saturating the surface and proved very satisfactory. The result of this experiment will doubtless lead to a more universal use of oil on the highways of the State.

For a full and accurate account of the roads under construction during the fiscal year, the following progress tables are herewith appended.

CONTRACTS COMPLETED DURING THE YEAR ENDING SEPTEMBER 30, 1906.

CHENANGO TOW-PATH ROAD, No. 175, BROOME COUNTY, N. Y.

Length, 1.84 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,250.

Contract dated, June 16, 1904.

Work commenced, November, 1904.

Work completed, December 19, 1905.

Final account, \$12,267.20.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

This road is a continuation of the Fenton road, No. 134, with which we now have four miles of macadam road extending northerly from Port Dickinson, a suburb of Binghamton, on the east side of the Chenango river.

The Board of Supervisors has improved the road southerly from the south end of the Fenton road through the incorporated village of Port Dickinson for about one and a half miles to connect with the city pavement.

The surface of this road is improved with six inches of macadam, built in two courses, four inches of crushed local fieldstone and two inches of New Jersey trap-rock.

REDWOOD-ALEXANDRIA BAY (SECTION 1) ROAD, No. 182,
JEFFERSON COUNTY, N. Y.

Length, 2.98 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$27,300.

Contract dated, July 14, 1904.

Work commenced, July, 1904.

Work completed, July 9, 1906.

Final account, \$27,876.

Contractor, Elisha W. Visger.

Engineer in charge, Guy H. Miller.

This road extends easterly from Alexandria Bay toward Redwood. The surface is improved with eight inches of macadam, consisting of four inches of crushed sandstone and four inches of crushed Adirondack gneiss. Neither of these rocks are desirable for road improvement, as they break up badly under the roller, and the residue is nothing but clean quartz sand which has no binding or cementing qualities, and a smooth hard surface is difficult to maintain in dry weather.

GREENE-SMITHVILLE FLATS ROAD, No. 218, CHENANGO
COUNTY, N. Y.

Length, 4.68 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,700.

Contract dated, July 13, 1904.

Work commenced, June, 1905.

Work completed, December 1, 1905.

Final account, \$35,106.07.

Contractors, Casey and Murray.

Engineer in charge, R. J. Marcher.

This improvement extends from the village of Greene up an easy winding grade over a hill and down into another valley to the hamlet of Smithville Flats. The macadam is six inches in thickness, four inches of local quarry bluestone and two inches of limestone from Syracuse.

CONTRACTS PENDING SEPTEMBER 30, 1906.

ENDICOTT ROAD, No. 174, BROOME COUNTY, N. Y.

Length, 2.17 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$22,500.

Contract dated, June 16, 1904.

Work commenced, June, 1905.

Work completed, 98 per cent.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

The Endicott road is a continuation of the Lestershire road, No. 125, with which we now have five miles of macadam roadway extending westerly from Lestershire, a suburb of Binghamton, on the north side of the Susquehanna river.

The bottom course of macadam is composed of four inches of local fieldstone and two inches of New Jersey trap-rock.

The improvement was completed in July of this year, but the road has not yet been inspected and accepted.

CENTER VILLAGE ROAD, No. 211, BROOME COUNTY, N. Y.

Length, 0.57 mile.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$5,000.

Contract dated, June 16, 1904.

Work commenced, August, 1906.

Work completed, 48 per cent.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

This road is the main Susquehanna River Road through the unincorporated village of Center Village. The macadam is six inches in thickness, the bottom course being four inches of local fieldstone and the top two inches of limestone from Schoharie.

OUAQUAGA ROAD, No. 212, BROOME COUNTY, N. Y.

Length, 1.01 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$9,350.

Contract dated, June 16, 1904.

Work commenced, May, 1906.

Work completed, 85 per cent.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

This road connects with the River road, Windsor, No. 213, and provides a macadam road, about four miles in length, from the village of Windsor, northeasterly up the Susquehanna river valley. The macadam consists of four inches of local fieldstone and two inches of limestone from Schoharie.

RIVER ROAD, WINDSOR (SECTION 2) ROAD, No. 213, BROOME COUNTY, N. Y.

Length, 2.83 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$25,900.

Contract dated, June 16, 1904.

Work commenced, July, 1904.

Work completed, 96 per cent.

Contractor, County of Broome.

Engineers in charge, N. E. Young and C. J. Myers.

This road extends from the corporation line of the village of Windsor northerly and connects with Road No. 212. The bottom course was built of local fieldstone and the top of Schoharie limestone. The work is practically completed and the road opened for traffic.

RIVER ROAD, WINDSOR (SECTION 1) ROAD, No. 214, BROOME
COUNTY, N. Y.

Length, 1.87 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$16,450.

Contract dated, June 16, 1904.

Work commenced, June, 1905.

Work completed, 99 per cent.

Contractor, County of Broome.

Engineers in charge, R. J. Marcher and C. J. Myers.

This road extends southerly from the village of Windsor, and is of the same construction as Roads Nos. 212 and 213.

ADAMS-HENDERSON (SECTION 2) ROAD, No. 234, JEFFERSON
COUNTY, N. Y.

Length, 6.89 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$49,950.

Contract dated, July 7, 1906.

Contractor, Celestin C. Burns.

No work has been done under this contract.

WATERTOWN-SACKETTS HARBOR-HENDERSON (SECTION 2) ROAD,
No. 235, JEFFERSON COUNTY, N. Y.

Length, 2.23 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$15,180.

Contract dated, July 7, 1906.

Work commenced, July, 1906.

Work completed, 28 per cent.

Contractor, Celestin C. Burns.

Engineer in charge, D. C. Wedgeworth.

This road is a continuation of Road No. 181, which, together with Road No. 237, provides an improved road from Watertown to and beyond Sacketts Harbor to Campbell's Point, a distance of about ten miles.

The macadam, six inches in thickness, is built of local quarried limestone in both courses.

GUILFORD ROAD, No. 225, CHENANGO COUNTY, N. Y.

Length, 5.75 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$50,000.

Contract dated, July 13, 1904.

Work commenced, August, 1904.

Work completed, 95 per cent.

Contractor, Douglas V. Ashley.

Engineers in charge, Waldo G. Wildes and Harry H. Greene.

This road is in three sections, improving the main roads or streets through the unincorporated villages of Rockwells Mills, Mt. Upton, Rockdale and Guilford, all in the township of Guilford.

While the improvement has dragged over three seasons, very good results have been obtained. Four inches of local fieldstone was used for the bottom course and two inches of limestone from Munnsville and Oriskany Falls for the top.

SACKETTS HARBOR ROAD, No. 237, JEFFERSON COUNTY, N. Y.

Length, 1.45 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$12,700.

Contract dated, July 9, 1906.

Work commenced, July, 1906.

Work completed, 51 per cent.

Contractors, Brennan and O'Brien.

Engineer in charge, D. C. Wedgeworth.

This road extends from the easterly end of Road No. 235, to the city line of Watertown. Local quarried limestone is used in both courses.

HENDERSON HARBOR ROAD, No. 238, JEFFERSON COUNTY, N. Y.

Length, 5.09 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,450.

Contract dated, July 7, 1906.

Contractor, Celestin C. Burns.

No work has been done under this contract.

UTICA-ONEIDA CASTLE (SECTION 1) ROAD, No. 250, ONEIDA COUNTY, N. Y.

Length, 8.53 miles.

Width of macadam, 16 feet; width of asphalt, 23 feet.

Engineer's preliminary estimate of total cost, including engineering, \$144,100.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 13 per cent.

Contractors, Casey and Murray.

Engineer in charge, Geo. R. Winslow.

This is the first section of the Seneca Turnpike from Utica to Oneida, across Oneida county, from Utica to New Hartford, a distance of 1.22 miles. The road is being improved with asphalt

on a concrete base, bordered with a concrete curb and gutter on each side. The additional cost of this pavement over and above that of a macadam road 20 feet wide has been provided by the abutting property owners with the assistance of the Electric R. R. Company operating a double-track railroad on one side of the highway.

The improvement of both the macadam and asphalt sections is well started.

DEPOSIT ROAD, No. 265, BROOME COUNTY, N. Y.

Length, 2.78 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,000.

Contract dated, July 12, 1906.

Work commenced, July, 1906.

Work completed, 19 per cent.

Contractor, County of Broome.

Engineers in charge, Guy L. Noble and Louis A. Burns.

This road extends easterly from Deposit. The work of improvement is well started and will no doubt be about half completed this season.

TUNNEL ROAD, No. 266, BROOME COUNTY, N. Y.

Length, 1.70 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,750.

Contract dated, July 12, 1906.

Contractor, County of Broome.

Nothing done as yet on this contract.

CASTLE CREEK ROAD, No. 267, BROOME COUNTY, N. Y.

Length, 6 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$54,750.

Contract dated, July 12, 1906.

Work commenced, July, 1906.

Work completed, 16 per cent.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

This road connects with Road No. 126, which, together with the Chenango River road, No. 47, will provide about nine miles of improved road from Binghamton, northerly along the west side of the Chenango river to the Castle creek valley; thence up said valley to the hamlet of Castle Creek.

The road is improved with crushed local field and quarry stone eight inches in thickness.

This work is being pushed along rapidly with a large force of men.

BRIDGE ROAD, NO. 268, BROOME COUNTY, N. Y.

Length, 1 mile.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$10,150.

Contract dated, July 12, 1906.

Work commenced, July, 1906.

Work completed, 66 per cent.

Contractor, County of Broome.

Engineer in charge, R. J. Marcher.

This road is a connecting link between the northerly ends of Roads Nos. 126 and 134, which are parallel on opposite sides of the Chenango river. With this connecting road a fine drive has been provided out of Binghamton, up one side of the Chenango river, crossing at Chenango bridge, and back down the other side, a total of about ten miles of macadam road from the ends of the city pavements, comprising about seven miles of State improved roads and about three miles improved by the county and city. The macadam consists of three inches of local stone and three inches of New Jersey trap-rock.

UTICA-ONEIDA CASTLE (SECTION 2) ROAD, NO. 271, ONEIDA
COUNTY, N. Y.

Length, 8.53 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$86,500.

Contract dated, September 15, 1906.

Contractors, Casey and Murray.

No work has been done under this contract.

GULF BRIDGE (SECTION 1) ROAD, NO. 274, BROOME COUNTY,
N. Y.

Length, 1.75 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$15,250.

Contract dated, July 12, 1906.

Contractor, County of Broome.

Nothing has been done on this contract.

UNION-MAINE ROAD, NO. 275, BROOME COUNTY, N. Y.

Length, 3.04 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$31,500.

Contract dated, July 12, 1906.

Contractor, County of Broome.

No work has been done under this contract.

OSWEGO-STERLING ROAD, NO. 280, OSWEGO COUNTY, N. Y.

Length, 1.66 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,550.

Contract dated, September 18, 1906.

Contractor, The Barnett Contracting Company.

Work under this contract has not yet been started.

SOUTH SALINA STREET ROAD, No. 290, ONONDAGA COUNTY, N. Y.

Length, 1.06 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,900.

Contract dated, August 31, 1906.

Contractor, Wm. J. Dwyer.

No work has been done on this contract.

WEST LAKE (SECTION 2) ROAD, No. 292, ONONDAGA COUNTY,
N. Y.

Length, 1 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$10,550.

Contract dated, July 10, 1906.

Contractor, Charles H. Quereau.

Nothing has been done on this contract.

EAST LAKE (SECTION 2) ROAD, No. 293, ONONDAGA COUNTY,
N. Y.

Length, 1 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$9,500.

Contract dated, July 10, 1906.

Work commenced, September, 1906.

Work completed, 6 per cent.

Contractor, Charles H. Quereau.

Engineer in charge, George D. Williams.

This road is an extension of Road No. 121 on the east side of Skaneateles lake. The improvement is just nicely started with a small force of men and teams.

MOHAWK RIVER ROAD, FLOYD, No. 295, ONEIDA COUNTY, N. Y.

Length, 2.80 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$29,750.

Contract dated, July 10, 1906.

Contractors, Casey and Murray.

This road together with Roads Nos. 296 and 297 extends from Deerfield Corners, a suburb of Utica, to the city of Rome, a total distance of eleven miles. No work has been done under this contract.

MOHAWK RIVER ROAD, MARCY, No. 296, ONEIDA COUNTY, N. Y.

Length, 4.54 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$49,200.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, 4 per cent.

Contractors, Casey and Murray.

Engineer in charge, C. J. Myers.

Work has just been started laying the bottom course of macadam, which is to be four inches of local stone or imported limestone, the latter being used at present. The top course is to be of Little Falls gneiss, three inches in thickness.

**MOHAWK RIVER ROAD, DEERFIELD, No. 297, ONEIDA COUNTY,
N. Y.**

Length, 3.74 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$36,850.

Contract dated, July 10, 1906.

Work commenced, July, 1906.

Work completed, 47 per cent.

Contractors, Casey and Murray.

Engineer in charge, C. J. Myers.

The bottom course of macadam of imported limestone is laid over the entire road. The top course specified is of Little Falls gneiss, which cannot be obtained this season, owing to the Crushed Stone Company having a contract with the N. Y. C. R. R. for their entire output. The bottom course has therefore been given a

finish and opened to travel. As the subgrade is mostly of sand, no bad effects are anticipated from the traffic during the coming winter.

VALLEY ROAD, MARCELLUS, No. 328, ONONDAGA COUNTY, N. Y.

Length, 1.31 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$19,500.

Contract dated, August 31, 1906.

Contractor, Wm. J. Dwyer.

No work has been done under this contract.

CAYUGA HEIGHTS ROAD, No. 336, TOMPKINS COUNTY, N. Y.

Length, 3.17 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,400.

Contract dated, August 30, 1906.

Contractor, County of Tompkins.

Work has not been started under this contract.

CATSKILL TURNPIKE (SECTION 2) ROAD, No. 338, TOMPKINS COUNTY, N. Y.

Length, 1.38 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$14,900.

Contract dated, August 30, 1906.

Contractor, County of Tompkins.

This road is a continuation of Road No. 72. No work has been done under this contract.

GEORGETOWN ROAD, No. 339, MADISON COUNTY, N. Y.

Length, 3.29 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$31,400.

Contract dated, September 18, 1906.

Contractor, Wm. I. Tyler.

No work has been done on this road.

COLLAMER ROAD, No. 348, ONONDAGA COUNTY, N. Y.

Length, 1.90 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$20,400.

Contract dated, July 9, 1906.

Work commenced, July, 1906.

Work completed, 65 per cent.

Contractor, Wm. J. Dwyer.

Engineers in charge, S. J. Stewart and George D. Williams.

This road extends from the village of Eastwood, a suburb of Syracuse, to Barton's Corners on the road to Collamer.

The improvement will, no doubt, be completed this year. The macadam is six inches in thickness, of gray limestone from the Solvay Process quarries at Split Rock near Syracuse.

AUGUSTA ROAD, ORISKANY FALLS SECTION, No. 369, ONEIDA COUNTY, N. Y.

Length, 2.99 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,600.

Contract dated, August 29, 1906.

Contractor, John H. Gordon.

No work has been done under this contract.

MINETTO ROAD, No. 370, OSWEGO COUNTY, N. Y.

Length, 0.48 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$6,750.

Contract dated, September 18, 1906.

Contractor, The Barnett Contracting Company.

Work has not been started on this contract.

MAINE ROAD, No. 374, BROOME COUNTY, N. Y.

Length, 3.37 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$33,550.

Contract dated, July 12, 1906.

Contractor, County of Broome.

No work has been done on this contract.

BARKER ROAD, No. 375, BROOME COUNTY, N. Y.

Length, 0.62 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$6,550.

Contract dated, July 12, 1906.

Contractor, County of Broome.

No work has been done on this contract.

CINCINNATUS ROAD, No. 377, CORTLAND COUNTY, N. Y.

Length, 0.42 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$4,000.

Contract dated, July 10, 1906.

Work commenced, July 20, 1906.

Work completed, 97 per cent.

Contractor, Charles H. Quereau.

Engineer in charge, N. E. Young.

This short road extends through the main street of the unincorporated village of Cincinnatus and has been improved with macadam six inches in thickness laid in two courses, both of which were formed of gray limestone from Mellen's quarry at Jamesville, Onondaga county. The improvement of this road is practically completed, but has not yet been inspected and accepted.

McGrawville Road, No. 378, Cortland County, N. Y.

Length, 2.90 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$30,750.

Contract dated, July 10, 1906.

Work commenced, August 6, 1906.

Work completed, 14 per cent.

Contractors, John Weber and Sons.

Engineer in charge, N. E. Young.

This road extends from the city line of Cortland to the corporation line of McGrawville. Owing to the lateness of awarding the contract and to the fact that the contractor had to purchase an entire new plant, the actual work of improvement is just getting under way, but no doubt about half of the macadam will be laid this year.

HARFORD ROAD, No. 379, Cortland County, N. Y.

Length, 0.91 mile.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$7,600.

Contract dated, September 19, 1906.

Contractors, John Weber and Sons.

No work has yet been done on this contract.

OWASCO ROAD, No. 383, Cayuga County, N. Y.

Length, 2.19 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,500.

Contract dated, July 10, 1906.

Work commenced, July 30, 1906.

Work completed, 42 per cent.

Contractors, Brayer Brothers.

Engineer in charge, E. C. Clark.

This road extends from the city line of the city of Auburn,

southerly along the east side of the Owasco outlet to the foot of Owasco lake and is a favored drive for the residents of Auburn, and also is one of the main roads leading into the city and is, therefore, subjected to very heavy traffic.

The road is improved with macadam six inches in thickness, the crushed stone for which is being obtained from Brayer Brothers' limestone quarry located just north of the north city line of Auburn.

The work of improvement of this road is being progressed rapidly and no doubt will be about 75 per cent completed at the end of the season.

VESTAL ROAD, No. 420, BROOME COUNTY, N. Y.

Length, 3.69 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$35,600.

Contract dated, July 12, 1906.

Contractor, County of Broome.

No work has yet been done on this contract.

ADAMS-WATERTOWN (SECTION 2) ROAD, No. 425, JEFFERSON COUNTY, N. Y.

Length, 3.16 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$26,100.

Contract dated, July 3, 1906.

Contractor, Wm. J. Semper.

No work has yet been done on this contract.

WATERTOWN-CARTHAGE (SECTION 2) ROAD, No. 427, JEFFERSON COUNTY, N. Y.

Length, 5.47 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$42,200.

Contract dated, July 7, 1906.

Work commenced, July 25, 1906.

Work completed, 30 per cent.

Contractor, Celestin C. Burns.

Engineer in charge, Frederick S. Strong.

This road extends from the village of Black River to DeFeriet's bridge on the south side of Black river on the main road leading from Watertown to Carthage. The road is improved with limestone macadam from various ledges and quarries along the line of the road. The contractors, while new at this class of work, have shown energy and are pushing the work rapidly to completion and, no doubt, will have the bulk of the work done this season.

THOMPSON ROAD, No. 429, ONONDAGA COUNTY, N. Y.

Length, 2.83 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$25,700.

Contract dated, July 9, 1906.

Contractor, Wm. J. Dwyer.

No work has been done on this contract.

JORDAN VALLEY (SECTION 1) ROAD, No. 430, ONONDAGA
COUNTY, N. Y.

Length, 1.72 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$15,200.

Contract dated, July 20, 1906.

Work commenced, July 23, 1906.

Work completed, 76 per cent.

Contractor, J. Charles Dayton.

Engineer in charge, George D. Williams.

This road extends from the railroad at Skaneateles Junction to the corporation line of the village of Elbridge. The road is improved with macadam six inches in thickness, laid in two courses, the bottom course being of crushed local fieldstone and

quarried limestone, the top course being of gray limestone from the Solvay Process quarries at Split Rock. The road will, no doubt, be completed this season.

SKANEATELES-SPAFFORD ROAD, No. 431, ONONDAGA COUNTY,
N. Y.

Length, 2.50 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$27,700.

Contract dated, July 20, 1906.

Contractor, J. Charles Dayton.

No work has been done on this contract.

AUGUSTA ROAD, LOWELL AND SPENCER SECTIONS, No. 438,
ONEIDA COUNTY, N. Y.

Length, 7.10 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$70,500.

Contract dated, August 29, 1906.

Work commenced, September 12, 1906.

Work completed, one-half of one per cent.

Contractor, M. F. Dollard.

Engineer in charge, George R. Winslow.

This road extends from the outer city line of the city of Rome, southerly to the junction of the Utica-Oneida Castle road, about two miles east of Vernon. Very little work has been done on this contract, and the only work contemplated for this season is rough grading and the construction of culverts.

CORTLAND-GROTON (SECTION 1) ROAD, No. 446, CORTLAND
COUNTY, N. Y.

Length, 1.35 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$11,100.

Contract dated, July 10, 1906.

Work commenced, September 19, 1906.

Contractor, Douglas V. Ashley.

Engineer in charge, N. E. Young.

This road extends westerly from the city line of the city of Cortland on the road leading to Groton. The work on this contract has just been started, the contractor now moving his plant from the Guilford road, in Chenango county, which he has just completed. He will, no doubt, complete about one-half of this work this season.

CICERO-SOUTH BAY ROAD, No. 452, ONONDAGA COUNTY, N. Y.

Length, 3.53 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$33,100.

Contract dated, July 9, 1906.

Contractor, Wm. J. Dwyer.

No work has been done on this contract.

ITHACA ROAD, No. 454, TOMPKINS COUNTY, N. Y.

Length, 3.66 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$37,900.

Contract dated, August 30, 1906.

Work commenced, September 17, 1906.

Work completed, 1 per cent.

Contractor, County of Tompkins.

Engineer in charge, S. J. Stewart.

This contract comprises the improvement of two pieces of road in the vicinity of Ithaca: one section known as the Lake section, extending northerly from the city line on the so-called Lake road, the other section extending southwesterly from the city line on the road leading to Newfield. The only work done consists of grading and the construction of culverts.

WYCKOFF ROAD, No. 455, TOMPKINS COUNTY, N. Y.

Length, 0.34 mile.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$4,500.

Contract dated, August 30, 1906.

Contractor, County of Tompkins.

No work has been done on this contract.

CATSKILL TURNPIKE (SECTION 3) ROAD, No. 483, TOMPKINS COUNTY, N. Y.

Length, 4.44 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$44,400.

Contract dated, August 30, 1906.

Work commenced, September, 1906.

Contractor, County of Tompkins.

Engineer in charge, S. J. Stewart.

This road is an extension of the Catskill turnpike, Road No. 72, being the main road from Ithaca to Slaterville Springs. The only work done this year will be that of rough grading.

CHITTENANGO-EAGLE VILLAGE ROAD, No. 506, MADISON COUNTY, N. Y.

Length, 2.18 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,700.

Contract dated, July 6, 1906.

Work commenced, July 25, 1906.

Work completed, 26 per cent.

Contractor, Wm. I. Tyler.

Engineer in charge, T. F. Nichols.

This road extends from the corporation line of the village of Chittenango, easterly to the Onondaga county line on the road to

Manlius village. This road extends over the hill between the villages named and has excessively heavy grades, running to 10 per cent for a long distance. In order to obtain even this grade heavy grading of earth and rock was necessary. The principal work done by the contractor has been on the rough grading, although he is now in position to proceed with the laying of macadam and, no doubt, will complete perhaps one mile of the work this season.

OSWEGO-MEXICO (SECTION 1) ROAD, NO. 509, OSWEGO COUNTY,
N. Y.

Length, 5.40 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$50,000.

Contract dated, July 6, 1906.

Work commenced, July 19, 1906.

Work completed, 33 per cent.

Contractors, Mott and Kemper.

Engineer in charge, E. H. Stewart.

This road extends from the city line of the city of Oswego on the direct road through Scriba Center towards Mexico. The work of improvement is progressing rapidly and, no doubt, three miles of the road will be completed this season.

HOMER-TULLY (SECTION 1) ROAD, NO. 510, CORTLAND COUNTY,
N. Y.

Length, 4.17 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$29,366.

Contract dated, July 10, 1906.

Contractors, John Weber and Sons.

No work has yet been done on this contract.

AUBURN-ELBRIDGE ROAD, No. 592, CAYUGA COUNTY, N. Y.

Length, 5.61 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$55,400.

Contract dated, September 18, 1906.

Contractors, Chambers and Grady.

No work has yet been done on this contract.

IMPROVEMENT OF PUBLIC HIGHWAYS.

Recapitulation of Work Done to September 30, 1906.

COUNTY.	Miles under contract during year ending Sept. 30, 1906.	Miles of plans and estimates completed prior to Sept. 30, 1905.	Miles of plans and estimates completed prior to Sept. 30, 1906.	Miles of plans and estimates completed during year ending Sept. 30, 1906.	Miles of surveys made during year ending Sept. 30, 1906.	Miles of contracts completed prior to Sept. 30, 1905.	Miles of contracts completed prior to Sept. 30, 1906.	Miles of contracts completed during year ending Sept. 30, 1906.
Broome.....	23.95	62.71	62.71	.....	.....	12.70	14.54	1.84
Cayuga.....	7.70	5.36	29.78	24.42	57.73	.....	.....	.....
Chenango.....	.....	28.79	44.96	16.17	52.19	10.66	15.34	4.68
Cortland.....	9.75	17.70	30.00	12.30	.....	4.45	4.45	.....
Jefferson.....	24.29	90.41	90.41	.....	.....	17.98	20.96	2.98
Lewis.....	.....	12.64	12.64	.....	.....	.....	.....	.....
Madison.....	2.18	4.86	19.72	14.86	18.75	.....	.....	.....
Oneida.....	38.23	82.19	91.28	9.09	3.47	12.35	12.35	.....
Onondaga.....	16.85	57.30	81.34	24.04	17.36	10.93	10.93	.....
Oswego.....	7.54	21.42	21.42	.....	.....	.....	.....	.....
St. Lawrence.....	.....	13.22	47.67	34.45	75.24	.....	.....	.....
Seneca.....	.....	33.95	33.95	.....	.....	.....	.....	.....
Tioga.....	.....	.....	.....	.....	.....	.....	.....	.....
Tompkins.....	12.99	14.86	14.86	.....	21.43	1.87	1.87	.....
Total.....	143.48	445.41	580.74	135.33	246.17	70.94	80.44	9.50

ROADS FOR WHICH CONTRACTS HAVE BEEN MADE UNDER CHAPTER 115, LAWS OF 1898, FROM SEPTEMBER 30, 1905, TO SEPTEMBER 30, 1906.

No.	Name of road.	Coun. y.	Petition No.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	Kind of Stone.		Per cent. completed to October 1, 1906.	Engineer's estimate.
									Bottom.	Top.		
224	Adams-Henderson, section 2.	Jefferson	339	July 7, 1906	6.80	12	22-26	2,219	Fieldstone.	Limestone.	.....	\$40,960
225	Watertown-Sacketts Harbor-Henderson, section 2.	Jefferson	340	July 7, 1906	2.23	12-16	23	{ Emb. 1,006 2,237 }	Limestone.	Limestone.	28	15,180
227	Sacketts Harbor.	Jefferson	341	July 9, 1906	1.45	16	23	{ Emb. 2,237 2,237 }	Limestone.	Limestone.	51	12,700
228	Henderson Harbor.	Jefferson	345	July 7, 1906	5.09	12	22-24	1,660	Fieldstone.	Limestone.	.....	30,460
230	Utica-Oneida Castle, section 1.	Oneida	319a	July 10, 1906	8.53	16-23	22-23-32	3,693	Limestone.	Limestone, asphalt and Little Fa la gneiss.	.....	144,100
235	Deposit.	Broome	317	July 12, 1906	2.78	14	23	3,381	Fieldstone.	Trap-rock.	13	30,000
236	Tunnel.	Broome	346	July 12, 1906	1.70	12	26	{ Emb. 2,729 3,133 }	Fieldstone.	Trap-rock.	19	13,780
237	Castle Creek.	Broome	{ 276 337 }	July 12, 1906	6.00	12	22-23	{ Emb. 3,133 3,447 }	Fieldstone.	Fieldstone.	16	54,780
238	Bridge.	Broome	237	July 12, 1906	1.00	12-16	23-23	3,447	Fieldstone.	Trap-rock.	66	10,150
241	Utica-Oneida Castle, section 2.	Oneida	319a	Sept. 15, 1906	8.53	16	22	2,849	Limestone.	Little Fa la gneiss.	.....	86,500
244	Gulf Bridge, section 1.	Broome	318	July 12, 1906	1.75	12	24-26	4,514	Fieldstone.	Trap-rock.	.....	15,250
245	Union-Maine.	Broome	351	July 12, 1906	3.04	12	24	{ Emb. 3,476 1,386 }	Fieldstone.	Fieldstone.	.....	31,500
280	Oswego-Sterling.	Oswego	254	Sept. 18, 1906	1.66	16	26	{ Emb. 1,386 1,981 }	Fieldstone.	Trap-rock.	.....	13,550
290	South Salina Street.	Onondaga	437	Aug. 31, 1906	1.06	16	23	{ Emb. 1,981 2,500 }	Limestone.	Trap-rock.	.....	13,900
292	West Lake, section 2.	Onondaga	581	July 10, 1906	1.00	16	26	{ Emb. 2,500 2,100 }	Fieldstone.	Limestone.	.....	10,550
293	East Lake, section 2.	Onondaga	583	July 10, 1906	1.00	16	26	{ Emb. 2,100 2,923 }	Fieldstone.	Limestone.	6	9,500
295	Mohawk River Road, Floyd.	Oneida	319b	July 10, 1906	2.80	16	26	{ Emb. 2,923 2,844 }	Limestone.	Little Fa la gneiss.	.....	29,750
296	Mohawk River Road, Marcy.	Oneida	319b	July 10, 1906	4.54	16	25	{ Emb. 2,844 1,568 }	Limestone.	Little Fa la gneiss.	4	49,200
237	Mohawk River Road, Deerfield.	Oneida	319b	July 10, 1906	3.74	16	23	{ Emb. 1,568 4,464 }	Limestone.	Little Fa la gneiss.	47	36,850
323	Valky Road, Marcellus.	Onondaga	573	Aug. 31, 1906	1.31	12-16	23	{ Emb. 4,464 6,151 }	Fieldstone.	Limestone.	.....	19,500
336	Cayuga Heights.	Tompkins	575	Aug. 30, 1906	3.17	12	24-25-28	{ Emb. 6,151 4,891 }	Fieldstone.	Limestone.	.....	37,400
338	Catskill Turnpike, section 2.	Tompkins	271	Aug. 30, 1906	1.38	16	26	{ Emb. 4,891 3,040 }	Fieldstone.	Limestone.	.....	14,900
339	Georgetown.	Madison	509	Sept. 18, 1906	3.23	12-16	22-23	3,040	Bluestone.	Limestone.	.....	31,400

348	Collamer.....	Onondaga.....	701	July 9, 1906	1.90	16	Emb. { 1,842	Limestone..	Limestone.....	65	20,400
349	Augusta, Oriskany Falls section.	Oneida.....	319c	Aug. 29, 1906	2.99	14	Emb. { 2,406	Fieldstone..	Limestone.....	.....	30,600
370	Minetto.....	Oswego.....	788	Sept. 18, 1906	0.48	16	4,479	Fieldstone..	Trap-rock.....	.....	0,750
374	Maine.....	Broome.....	{ 359	July 12, 1906	3.37	12	2,801	Fieldstone..	Fieldstone.....	.....	33,550
375	Barker.....	Broome.....	471	July 12, 1906	0.02	16	Emb. { 3,252	Fieldstone..	Trap-rock.....	.....	6,550
377	Cincinnati.....	Cortland.....	483	July 10, 1906	0.42	16	Emb. { 1,571	Limestone..	Limestone.....	97	4,000
378	McGrawville.....	Cortland.....	{ 454	July 10, 1906	2.90	12-16	Emb. { 2,233	Fieldstone..	Limestone.....	14	30,750
379	Harford.....	Cortland.....	{ 506	Sept. 19, 1906	0.91	12	1,648	Fieldstone..	Limestone.....	.....	7,000
383	Owasco.....	Cayuga.....	126	July 10, 1906	2.19	16	Emb. { 1,336	Limestone..	Limestone.....	42	21,500
420	Vestal.....	Broome.....	{ 364	July 12, 1906	3.69	12-16	Emb. { 3,008	Fieldstone..	Trap-rock.....	.....	35,600
425	Adams-Watertown, section 2.	Jefferson.....	480	July 3, 1906	3.16	12-16	3,513	Fieldstone..	Limestone.....	.....	23,100
427	Watertown-Carthage, section 2.	Jefferson.....	{ 464	July 7, 1906	5.47	12-16	Emb. { 1,857	Limestone..	Limestone.....	30	42,200
429	Thompson.....	Onondaga.....	702	July 9, 1906	2.83	12	Emb. { 3,021	Limestone..	Limestone.....	.....	25,700
430	Jordan Valley, section 1.	Onondaga.....	{ 582	July 20, 1906	1.72	12	Emb. { 2,600	Fieldstone..	Limestone.....	76	15,200
431	Stannett-Spafford.....	Onondaga.....	{ 703	July 20, 1906	2.50	12	Emb. { 4,458	Limestone..	Limestone.....	.....	21,700
438	Augusta, Lowell and Spencer sections.	Oneida.....	319c	Aug. 29, 1906	7.10	14-16	Emb. { 1,746	Limestone..	Limestone.....	‡	70,500
446	Cortland-Groton, section 1.	Cortland.....	995	July 10, 1906	1.35	16	1,923	Fieldstone..	Limestone.....	.....	11,100
452	Cicero-South Bay.....	Onondaga.....	705	July 9, 1906	3.53	16	Emb. { 1,848	Limestone..	Limestone.....	.....	33,100
454	Ithaca.....	Tompkins.....	{ 891	Aug. 30, 1906	3.66	16	Emb. { 3,033	Fieldstone..	Limestone.....	1	37,900
455	Wyckoff.....	Tompkins.....	1,000	Aug. 30, 1906	0.34	12	Emb. { 5,809	Fieldstone..	Limestone.....	.....	4,500
453	Catskill Turnpike, section 3.	Tompkins.....	1,030	Aug. 30, 1906	4.44	12-16	Emb. { 2,860	Fieldstone..	Limestone.....	.....	44,400
506	Chittenango-Eagle Village.	Madison.....	744	July 6, 1906	2.18	12	5,000	Limestone..	Limestone.....	23	21,700
509	Oswego-Mexico, section 1.	Oswego.....	770	July 6, 1906	5.40	16	Emb. { 2,309	Fieldstone..	Local sandstone	33	50,000
510	Homer-Tully, section 1.	Cortland.....	912c	July 10, 1906	4.17	12	Emb. { 1,685	Fieldstone..	Limestone.....	.....	23,366
502	Auburn-Elbridge.....	Cayuga.....	{ 1,198	Sept. 18, 1906	5.61	12-16	Emb. { 2,032	Limestone..	Limestone.....	.....	55,400

The business of this office has been so largely augmented during the year by reason of the Road and Barge canal contracts, that the engineering force has been increased at times to a personnel of 200 men. Their efficiency has been most marked. They have rendered valuable assistance and the writer desires to express his appreciation of their faithful and conscientious service. I also desire to extend to you my thanks for the valuable suggestions and help rendered me in the performance of my duty.

Respectfully submitted,

CHAS. O. McCOMB,

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS EMPLOYED IN THE MIDDLE DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES, FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1906.

Ordinary Repairs to Canals — Erie Canal.

Chapter 699, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb	Division engineer	\$3,600 per year	\$287 50	\$3 80	\$491 30
Fred W. Sarr	First resident engineer	2,700 per year	737 50	6 10	743 60
L. D. Norton	Financial clerk	5 00 per day	560 00	60	560 60
Howard U. Lyon	Estimate clerk	5 00 per day	396 00	7 47	403 47
John M. Turner	Stenographer	1,100 00 per year	133 07		133 07
Geo. M. Haight	Stenographer	2 50 per day	22 50		22 50
Harvey Wagner	Stenographer	75 00 per month	3 5 00		3 5 00
D. C. Wedgeworth	Assistant engineer	6 00 per day	323 00	2 50	325 50
Geo. D. Williams	Assistant engineer	6 00 per day	2 00	11 53	13 53
E. C. Clark	Assistant engineer	5 00 per day	100 00	33 56	133 56
Guy L. Noble	Assistant engineer	5 00 per day	23 00	3 23	26 23
D. E. Whitford	Assistant engineer	5 00 per day	215 00	1 54	216 54
Wm. S. Morris	Reaman	3 50 per day	52 00		52 00
C. H. Mattison	Chainman	3 00 per day	12 00	3 60	15 60
A. H. Scheutsoy	Chainman	2 50 per day	2 50		2 50
John Connors	Laborer	2 00 per day	480 00		480 00
J. A. Haskell	Laborer	2 00 per day	22 00		22 00
Geo. J. Gochl	Laborer	2 00 per day	4 00		4 00
C. S. Moyer	Laborer	2 00 per day	54 00		54 00
					\$4,646 08
<i>Incidental Expenses.</i>					
Stationery and printing				\$137 53	
Livery				38 60	
Fuel and light				221 30	
Postage				60 87	
Telephone and telegraph				4 0 22	
Miscellaneous				934 19	
					1,852 61
Total					\$6,498 69

Ordinary Repairs to Canals — Oswego Canal.

Chapter 699, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb	Division engineer	\$3,600 per year	\$50 00		\$50 00
Fred W. Sarr	First resident engineer	2,700 per year	75 00	\$4 30	79 30
D. C. Wedgeworth	Assistant engineer	5 00 per day	275 00	7 65	282 65
Edward M. Ellis	Draftsman	4 00 per day	4 00		4 00
C. H. Mattison	Chainman	3 00 per day	3 00	20	3 20
Ernest W. Dalton	Laborer	2 00 per day	6 00		6 00
					\$425 15
<i>Incidental Expenses.</i>					
Miscellaneous				\$0 23	
					23
Total					\$425 40

Ordinary Repairs to Canals—Cayuga and Seneca Canal.

Chapter 699, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb.....	Division engineer.....	\$3,600 per year	\$125 00	\$4 65	\$129 65
Fred W. Sarr.....	First resident engineer.....	2,700 per year	150 00	8 65	158 65
E. J. Marcher.....	Assistant engineer.....	6 00 per day	6 00	3 48	9 48
Geo. D. Williams.....	Assistant engineer.....	6 00 per day	24 00	17 05	41 05
D. E. Whitford.....	Assistant engineer.....	5 00 per day	200 00	7 13	207 13
Rupert Sturtevant.....	Rodman.....	3 50 per day	50		3 50
C. H. Mattison.....	Chainman.....	3 00 per day	24 00	10 76	34 76
Geo. C. Hannon.....	Laborer.....	2 00 per day	2 00		2 00
E. W. Parsons.....	Laborer.....	2 00 per day	8 00		8 00
					\$654 22
<i>Incidental Expenses.</i>					
Livery.....				\$3 50	
Telephone and telegraph.....				35	
Miscellaneous.....				1 65	
					5 50
Total.....					\$659 72

Ordinary Repairs to Canals—Black River Canal.

Chapter 699, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb.....	Division engineer.....	\$3,600 per year	\$187 50	\$15 60	\$203 10
Fred W. Sarr.....	First resident engineer.....	2,700 per year	287 50	25 56	313 06
Fred'k S. Strong.....	Assistant engineer.....	5 00 per day	400 00	152 89	552 89
D. E. Whitford.....	Assistant engineer.....	5 00 per day	10 00	5 61	15 61
E. J. Berry.....	Lavaler.....	5 00 per day	10 00	16 16	26 16
L. Kavanagh.....	Chainman.....	3 00 per day	112 00		162 00
J. A. Haskell.....	Laborer.....	2 00 per day	4 00		4 00
					\$1,276 82
<i>Incidental Expenses.</i>					
Livery.....				\$124 00	
Telephone and telegraph.....				1 47	
Miscellaneous.....				3 93	
					139 40
Total.....					\$1,416 22

MIDDLE DIVISION: ENGINEERING EXPENSES.

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Construction of Barge Canal — Erie Canal.

Chapter 147, Laws of 1903.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb.....	Division engineer.....	\$3,000 per year	\$1,225 00	\$47 22	\$1,272 22
Guy Moulton.....	Resident engineer.....	2,400 per year	2,400 00	135 90	2,535 90
Emile Low.....	Resident engineer.....	2,400 per year	2,400 00	202 09	2,602 09
M. B. Palmer.....	Resident engineer.....	2,400 per year	2,400 00	220 55	2,620 55
L. D. Norton.....	Financial clerk.....	5 00 per day	420 00	2 06	422 06
Howard U. Lyon.....	Estimate clerk.....	5 00 per day	572 00	27 34	599 34
John M. Turner.....	Stenographer.....	1,100 per year	137 50		137 50
Harvey Wagner.....	Stenographer.....	75 00 per month	75 00		75 00
C. H. Morgan.....	Stenographer.....	75 00 per month	61 69		61 69
Willard O. White.....	Assistant engineer.....	6 00 per day	1,704 00	18 10	1,722 10
Fred J. Wagner.....	Assistant engineer.....	6 00 per day	1,872 00	248 51	2,120 51
F. P. Williams.....	Assistant engineer.....	6 00 per day	348 00	523 66	871 66
A. D. Sanderson.....	Assistant engineer.....	6 00 per day	1,230 00	523 56	1,753 56
Carl L. Bannister.....	Assistant engineer.....	6 00 per day	1,691 00	75 91	1,766 91
Kieffer Lindsay.....	Assistant engineer.....	6 00 per day	1,644 00	302 39	1,946 39
G. W. Stickney.....	Assistant engineer.....	6 00 per day	1,585 00	51 23	1,636 23
Charles Kiehm.....	Assistant engineer.....	6 00 per day	841 50	65 60	907 10
R. R. Bradbury.....	Assistant engineer.....	5 00 per day	840 00	23 75	863 75
Guy L. Noble.....	Assistant engineer.....	5 00 per day	810 00	245 45	1,055 45
J. N. Slater.....	Assistant engineer.....	5 00 per day	570 00		570 00
R. J. Murray.....	Assistant engineer.....	5 00 per day	600 00	2 30	602 30
Fred'k S. Strong.....	Assistant engineer.....	5 00 per day	645 00	35 79	680 79
Arthur T. O'Leary.....	Assistant engineer.....	5 00 per day	360 00	64 38	424 38
Daniel B. Donovan.....	Assistant engineer.....	5 00 per day	1,474 00	501 43	1,975 43
Louis A. Burns.....	Assistant engineer.....	5 00 per day	1,060 50		1,060 50
Wm. W. Cronin.....	Assistant engineer.....	5 00 per day	1,239 50	10 92	1,300 42
E. J. Barry.....	Leveller.....	5 00 per day	1,325 00		1,325 00
Oscar Hasbrouck.....	Leveller.....	5 00 per day	45 00		45 00
Harry H. Greene.....	Leveller.....	4 50 per day	247 50		247 50
John D. Groves.....	Leveller.....	4 50 per day	90 00		90 00
Chas. G. Ranney.....	Leveller.....	4 50 per day	13 50	4 67	18 17
Chas. W. Costello.....	Leveller.....	4 50 per day	1,275 00	64 38	1,339 38
Fred'k G. Bennett.....	Leveller.....	4 50 per day	1,117 00	3 80	1,120 80
N. R. McLoud.....	Leveller.....	4 50 per day	973 50		973 50
Arthur G. Cryslar.....	Leveller.....	4 50 per day	1,243 50		1,243 50
Louis Garbi, Jr.....	Leveller.....	4 50 per day	333 00		333 00
J. Otis Burt.....	Draftsman.....	5 00 per day	1,319 00	4 53	1,323 53
R. M. Fraser.....	Architectural draftsman.....	100 00 per month	70 00		70 00
Guy B. Skinner.....	Draftsman.....	4 00 per day	124 00		124 00
De Witt H. Daley.....	Draftsman.....	4 00 per day	36 00		36 00
Carl F. Hops'lein.....	Draftsman.....	4 00 per day	981 00	3 20	984 20
Jno. A. Pritchard.....	Tracer.....	50 00 per month	40 00		40 00
Leo B. Wes'fall.....	Tracer.....	50 00 per month	18 33		18 33
Geo. H. Thomas.....	Rodman.....	4 00 per day	951 50		951 50
Thos. D. Ringwood.....	Rodman.....	3 50 per day	469 00	40 20	509 20
Fred C. Ashley.....	Rodman.....	3 50 per day	31 50		31 50
Wm. S. Morris.....	Rodman.....	3 50 per day	143 50		143 50
Foster B. Crocker.....	Rodman.....	3 50 per day	234 00		234 00
Stephen B. McDonald.....	Rodman.....	3 50 per day	231 00		231 00
Claude F. Gleason.....	Rodman.....	3 50 per day	234 00		234 00
Fred La Forge.....	Foreman of borings.....	4 00 per day	144 00	4 32	148 32
Fred H. Palmer.....	Foreman of borings.....	3 50 per day	1,092 00	10	1,092 10
H. W. Stoneburg.....	Foreman of borings.....	3 50 per day	1,062 00	142 03	1,204 03
W. H. Breen.....	Foreman of borings.....	3 50 per day	23 00	7 08	30 08
M. V. McCoy.....	Foreman of borings.....	3 50 per day	175 00	1 54	176 54
Alfred Evans.....	Inspector.....	4 00 per day	480 00		480 00
C. H. Mattison.....	Chainman.....	3 00 per day	789 00	69 51	858 51
Frank Lutz.....	Chainman.....	3 00 per day	848 00		848 00
Henry C. Little.....	Chainman.....	2 50 per day	712 50		712 50
Jas. M. Wilson.....	Chainman.....	2 50 per day	232 50		232 50
E. W. Parsons.....	Laborer.....	2 00 per day	154 00		154 00
Walter J. O'Brien.....	Laborer.....	2 00 per day	180 00		180 00
George Scott.....	Laborer.....	2 00 per day	624 00		624 00
Edward B. Folley.....	Laborer.....	2 00 per day	180 00		180 00
Warden T. Marriott.....	Laborer.....	2 00 per day	180 00		180 00
Lyle B. Marcy.....	Laborer.....	2 00 per day	52 00		52 00
John File.....	Laborer.....	2 00 per day	186 00		186 00
D. Cameron.....	Laborer.....	2 00 per day	140 00		140 00
Clarence Phelps.....	Laborer.....	2 00 per day	622 00	141 38	763 38
Levi Odell.....	Laborer.....	2 00 per day	154 00		154 00
Joseph Taff.....	Laborer.....	2 00 per day	22 00		22 00
Robt. P. Britt.....	Laborer.....	2 00 per day	72 00		72 00

Construction of Barge Canal—Erie Canal—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Wm. J. Lloyd	Laborer	\$2 00 per day	\$210 00	\$34 50	\$244 50
Sylvester Wilcox	Laborer	2 00 per day	531 00		531 00
John Zingine	Laborer	2 00 per day	72 00		72 00
J. P. Murphy	Laborer	2 00 per day	50 00		50 00
Geo. F. Mead	Laborer	2 00 per day	180 00		180 00
Floyd C. Oatman	Laborer	2 00 per day	24 00		24 00
Cyrus Carpenter	Laborer	2 00 per day	24 00		24 00
David Rooney	Laborer	2 00 per day	24 00		24 00
George E. Sessions	Laborer	2 00 per day	66 00		66 00
Irving W. Lester	Laborer	2 00 per day	612 00	33 78	645 78
C. S. Allen	Laborer	2 00 per day	64 00		64 00
H. S. Oatman	Laborer	2 00 per day	124 00		124 00
W. D. Curtis	Laborer	2 00 per day	68 00		68 00
W. J. Wilds	Laborer	2 00 per day	124 00		124 00
F. A. Gordon	Laborer	2 00 per day	24 00		24 00
A. G. Bannan	Laborer	2 00 per day	24 00		24 00
Frank Bronson	Laborer	2 00 per day	2 00		2 00
Arthur W. Matson	Laborer	2 00 per day	2 00		2 00
Alfred White	Laborer	2 00 per day	6 00		6 00
Joe. F. O'Brien	Laborer	2 00 per day	2 00		2 00
Hume Morse	Laborer	2 00 per day	42 00		42 00
Wendy Jaquish	Laborer	2 00 per day	432 00		432 00
Thos. A. Savin	Laborer	2 00 per day	2 00		2 00
Herbert E. Kane	Laborer	2 00 per day	8 00		8 00
Henry Jaquish	Laborer	2 00 per day	2 2 00		2 2 00
Fred Derricks	Laborer	2 00 per day	490 00		490 00
Abraham H. Stein	Laborer	2 00 per day	210 00		210 00
Herbert J. Stevens	Laborer	2 00 per day	144 00		144 00
Harry E. Poole	Laborer	2 00 per day	38 00		38 00
C. R. D. Graff	Laborer	2 00 per day	56 00		56 00
Ernest E. Hader	Laborer	2 00 per day	38 00		38 00
Franc E. Miller	Laborer	2 00 per day	14 00		14 00
B. J. Sheppard	Laborer	2 00 per day	134 00		134 00
F. C. Chamberlain	Laborer	2 00 per day	148 00		148 00
Peter Kappas	Laborer	2 00 per day	180 00		180 00
A. A. Wagner	Laborer	2 00 per day	122 00		122 00
J. E. Braslow	Laborer	2 00 per day	41 00		41 00
Harry C. Smith	Laborer	2 00 per day	124 00		124 00
James Fogarty	Laborer	2 00 per day	38 00		38 00
Geo. J. Gohl	Laborer	2 00 per day	24 00		24 00
B. A. R. Dingon	Laborer	2 00 per day	2 2 00		2 2 00
Samuel C. B. Singer	Laborer	2 00 per day	90 00		90 00
Wm. Lewis Woodbury	Laborer	2 00 per day	23 00		23 00
Arthur Miles	Laborer	2 00 per day	76 00		76 00
Chas. Wagner	Laborer	2 00 per day	49 00		49 00
Grand Geronix	Laborer	2 00 per day	12 00		12 00
John L. Bliss	Laborer	2 00 per day	17 00		17 00
Walter B. Jewett	Laborer	2 00 per day	312 00		312 00
James Mahony	Laborer	2 00 per day	3 2 00		3 2 00
Alfred Mosberger	Laborer	2 00 per day	3 1 00		3 1 00
Leslie Pichin	Laborer	2 00 per day	94 00		94 00
F. V. Decker	Laborer	2 00 per day	112 00	3 23	115 23
Albert A. Fisher	Gage reader	12 00 per month	86 83		86 86
Solomon Wall	Gage reader	7 00 per month	84 00		84 00
Edward Strong	Gage reader	7 00 per month	84 00		84 00
Fred Miller	Gage reader	7 00 per month	84 00		84 00
Daniel Brown	Gage reader	6 00 per month	72 00		72 00
John Phillips	Gage reader	6 00 per month	72 00		72 00
Bessie C. Kellogg	Gage reader	4 00 per month	48 00		48 00
Mrs. Augustus H. Hoffman	Gage reader	7 00 per month	74 67		74 67
W. T. Grill	Gage reader	7 00 per month	2 33		2 33
E. D. Jones	Gage reader	7 00 per month	33 17		33 17
Rayner Powell	Gage reader	7 00 per month	27 07		27 07
W. M. Hubbard	Gage reader	5 00 per month	45 00		45 00
Chas. Bourke	Gage reader	5 00 per month	6 23		6 23
A. D. Barber	Gage reader	7 00 per month	56 00		56 00
Jos. Kennedy	Gage reader	5 00 per month	18 00		18 00
J. H. Roper	Gage reader	5 00 per month	38 75		38 75
Frank Barnes	Gage reader	5 00 per month	23 83		23 83
F. B. Rendall	Gage reader	5 00 per month	60 00		60 00
Edward Carleton	Gage reader	5 00 per month	60 00		60 00
Jno. Chamberlain	Gage reader	5 00 per month	60 00		60 00
Frank Shane	Gage reader	5 00 per month	60 00		60 00
Chas. Brannock	Gage reader	5 00 per month	60 00		60 00
Ed. Jones	Gage reader	5 00 per month	58 55		58 55

Construction of Barge Canal — Erie Canal — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
E. A. Evans.....	Gage reader.....	\$5 00 per month	\$60 00		\$60 00
Geo. H. Meeker.....	Gage reader.....	5 00 per month	15 00		15 00
Jas. A. Ten Eyck.....	Gage reader.....	5 00 per month	17 00		17 00
Adniram Hart.....	Gage reader.....	5 00 per month	60 00		60 00
Louis McArthur.....	Gage reader.....	5 00 per month	60 00		60 00
Wm. Prettie.....	Gage reader.....	5 00 per month	60 00		60 00
James Ray.....	Gage reader.....	5 00 per month	20 00		20 00
					\$65,294 43
<i>Incidental Expenses.</i>					
Instruments and tools.....				\$1,401 73	
Office rent.....				658 50	
Fuel and light.....				397 12	
Stationery and printing.....				74 60	
Postage.....				175 47	
Telephone and telegraph.....				210 08	
Miscellaneous.....				6,237 02	
					9,215 02
Total.....					\$74,509 45

Construction of Barge Canal — Oswego Canal.

Chapter 147, Laws of 1903.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb.....	Division engineer.....	\$3,600 per year	\$425 00	\$12 45	\$437 45
B. E. Failing.....	Resident engineer.....	2,400 per year	2,398 80	3 64	2,442 44
L. D. Norton.....	Financial clerk.....	5 00 per day	160 00		160 00
Howard U. Lyon.....	Estimate clerk.....	5 00 per day	76 00	1 10	77 10
Edwin Styring.....	Assistant engineer.....	6 00 per day	1,716 00	309 82	2,025 82
Chas. A. Pohl.....	Assistant engineer.....	6 00 per day	1,716 00	3 50	1,719 50
Wm. W. Cronin.....	Assistant engineer.....	5 00 per day	20 00	7 00	27 00
Ernest F. Ayres.....	Assistant engineer.....	5 00 per day	615 50	28 67	642 17
Thos. R. Tetley, Jr.....	Assistant engineer.....	5 00 per day	1,308 00	25 91	1,333 91
Jos. H. Young.....	Draftsman.....	5 00 per day	1,385 00	74 61	1,459 61
J. Otis Burt.....	Draftsman.....	5 00 per day	60 00	50	60 50
Wm. S. Morris.....	Rodman.....	3 50 per day	49 00		49 00
Earl L. Keeler.....	Chainman.....	3 00 per day	936 00	11 35	947 35
C. H. Mattison.....	Chainman.....	3 00 per day	51 00	8 25	59 25
Victor C. Lewis.....	Boatman.....	3 00 per day	807 00		807 00
Wm. A. Thurston.....	Laborer.....	2 00 per day	616 00	360 77	976 77
E. H. Campau.....	Laborer.....	2 00 per day	616 00		616 00
E. M. Bonner.....	Laborer.....	2 00 per day	616 00		616 00
C. W. Johnson.....	Laborer.....	2 00 per day	72 00		72 00
Harry C. Webb.....	Laborer.....	2 00 per day	540 00		540 00
Frank M. Hughes.....	Gage reader.....	12 00 per month	144 00		144 00
D. D. Tompkins.....	Gage reader.....	5 00 per month	60 00		60 00
Samuel L. Purdy.....	Gage reader.....	5 00 per month	60 00		60 00
Roy L. Smith.....	Gage reader.....	5 00 per month	15 00		15 00
Smith Sharpe.....	Gage reader.....	5 00 per month	60 00		60 00
J. M. Johnson.....	Gage reader.....	5 00 per month	60 00		60 00
Geo. Archambo.....	Gage reader.....	6 00 per month	61 00		61 00
Milton Engle.....	Gage reader.....	5 00 per month	45 00		45 00
					\$15,593 87
<i>Incidental Expenses.</i>					
Instruments and tools.....				\$170 89	
Office rent.....				225 00	
Fuel and light.....				104 23	
Stationery and printing.....				12 72	
Postage.....				38 00	
Telephone and telegraph.....				51 94	
Miscellaneous.....				413 46	
					1,025 24
Total.....					\$16,619 11

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. O. McComb.....	Division engineer.	\$3,600 per year	\$900 00	\$355 84	\$1,255 84
Fred W. Sarr.....	First resident engineer	2,700 per year	1,250 00	317 37	1,567 37
L. D. Norton.....	Financial clerk.	5 00 per day	410 00	3 40	413 40
Howard U. Lyon.....	Estimate clerk.	5 00 per day	455 00	9 46	464 46
Stanley P. Wells.....	Stenographer.	75 00 per month	40 00		40 00
John M. Turner.....	Stenographer.	1,100 per year	45 83		45 83
Harvey Wagner.....	Stenographer.	75 00 per month	150 00		150 00
C. H. Morgan.....	Stenographer.	75 00 per month	37 50		37 50
Geo. D. Williams.....	Assistant engineer	6 00 per day	1,464 00	153 58	1,617 58
R. J. Marcher.....	Assistant engineer	6 00 per day	1,866 00	343 82	2,209 82
E. C. Clark.....	Assistant engineer	6 00 per day	1,576 00	1,470 18	3,046 18
Geo. R. Winslow.....	Assistant engineer	6 00 per day	390 00	139 41	529 41
Frederick S. Strong.....	Assistant engineer	6 00 per day	608 00	28 35	636 35
T. F. Nichols.....	Assistant engineer	6 00 per day	524 00	16 96	544 96
Nathan E. Young.....	Assistant engineer	6 00 per day	423 00	88 23	511 23
Spencer J. Stewart.....	Assistant engineer	6 00 per day	330 00	58 69	388 69
R. J. Murray.....	Assistant engineer	6 00 per day	684 00	20 11	704 11
Kieffer Lindsay.....	Assistant engineer	6 00 per day	72 00	73 03	145 03
Harvey F. Hawley.....	Assistant engineer	6 00 per day	1,617 00		1,617 00
D. C. Wedgeworth.....	Assistant engineer	6 00 per day	82 00	74 00	156 00
Waldo G. Wilds.....	Assistant engineer	5 00 per day	315 00	5 00	320 00
Guy H. Miller.....	Assistant engineer	5 00 per day	230 00	11 22	241 22
W. W. Stone.....	Assistant engineer	5 00 per day	605 00	690 27	1,295 27
Henry B. Brewster.....	Assistant engineer	5 00 per day	5 00		5 00
Louis A. Burns.....	Assistant engineer	5 00 per day	135 00	26 12	161 12
C. J. Myers.....	Assistant engineer	5 00 per day	915 00	11 30	926 30
David R. Lee.....	Assistant engineer	5 00 per day	190 00	321 92	511 92
E. H. Stewart.....	Assistant engineer	5 00 per day	230 00	8 91	238 91
D. E. Whitford.....	Assistant engineer	5 00 per day	575 00		575 00
Guy L. Noble.....	Assistant engineer	5 00 per day	615 00	32 86	647 86
Thos. E. Finucane.....	Assistant engineer	5 00 per day	998 50	45 45	1,043 95
L. D. Brownell.....	Assistant engineer	5 00 per day	1,000 00	846 73	1,906 73
E. J. Berry.....	Leveler	5 00 per day	160 00		160 00
Wm. H. Snyder.....	Leveler	5 00 per day	470 00	85	470 85
Harry H. Greene.....	Leveler	4 50 per day	1,165 50	21 06	1,186 56
Walter W. Ewell.....	Leveler	4 50 per day	234 00		234 00
Le Roy J. McCarty.....	Leveler	4 50 per day	72 00		72 00
Stephen B. McDonald.....	Leveler	4 50 per day	27 00		27 00
Smith O. Steele.....	Leveler	4 50 per day	243 00	3 90	246 90
J. Fred Barber.....	Leveler	4 50 per day	81 00	13 34	94 34
Geo. Yavroumis.....	Leveler	4 50 per day	54 00		54 00
Chas. H. Rogers.....	Leveler	4 50 per day	184 50		184 50
W. J. Durkan.....	Leveler	4 50 per day	232 50		232 50
Thos. D. Ringwood.....	Leveler	4 50 per day	754 00		754 00
Edward M. F. Isa.....	Leveler	5 00 per day	1,422 00		1,422 00
Vann R. Phillips.....	Draftsman.	4 00 per day	172 00		172 00
Frederick E. Arthur.....	Tracer.	75 00 per month	703 06		703 06
A. W. Rogers.....	Inspector of highways.	3 50 per day	557 00		557 00
Bernace B. Weber.....	Rodman.	3 50 per day	231 00		231 00
J. S. Eastman.....	Rodman.	3 50 per day	233 00		233 00
Geo. H. Thomas.....	Rodman.	3 50 per day	210 00		210 00
E. H. Dahmon.....	Rodman.	3 50 per day	175 00		175 00
Clare D. Murray.....	Rodman.	3 50 per day	245 00		245 00
R. E. Miller.....	Rodman.	3 50 per day	175 00	1 68	176 68
Rupert Stortevant.....	Rodman.	3 50 per day	494 50		494 50
Wm. S. Morris.....	Rodman.	3 50 per day	289 00		289 00
C. H. Mattison.....	Chainman.	3 00 per day	45 00	21 79	66 79
L. Kavanagh.....	Chainman.	3 00 per day	789 00	8 40	797 40
Roy F. Hall.....	Chainman.	3 00 per day	749 00	2 56	751 56
Jas. M. Wilson.....	Chainman.	2 50 per day	142 50		142 50
Raymond C. Pugh.....	Chainman.	2 50 per day	15 00		15 00
D. W. Scripture.....	Chainman.	2 50 per day	435 00		435 00
W. A. H. Scheutzw.....	Chainman.	2 50 per day	432 50		432 50
Albert Armstrong.....	Laborer.	2 00 per day	120 00		120 00
S. C. Bettinger.....	Laborer.	2 00 per day	118 00		118 00
Wm. Payne.....	Laborer.	2 00 per day	98 00		98 00
B. A. Redington.....	Laborer.	2 00 per day	50 00		50 00
Peter Kappesser.....	Laborer.	2 00 per day	280 00		280 00
Geo. C. Hannon.....	Laborer.	2 00 per day	478 00		478 00
Ambrase Wait.....	Laborer.	2 00 per day	42 00		42 00
Fred W. Barker.....	Laborer.	2 00 per day	72 00		72 00
W. J. Wilds.....	Laborer.	2 00 per day	328 00		328 00
Walter B. Jewett.....	Laborer.	2 00 per day	312 00		312 00

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. H. Evans.....	Laborer.....	\$2 00 per day	\$116 00		\$116 00
F. H. Mongin.....	Laborer.....	2 00 per day	616 00	\$1 30	617 30
Geo. J. Goehl.....	Laborer.....	2 00 per day	600 00		600 00
Ernest W. Dalton.....	Laborer.....	2 00 per day	574 00		574 00
Jno. D. Bloxham.....	Laborer.....	2 00 per day	112 00		112 00
A. E. Stewart.....	Laborer.....	2 00 per day	142 00		142 00
J. A. Haskell.....	Laborer.....	2 00 per day	296 00		296 00
Anthony Manley.....	Laborer.....	2 00 per day	164 00		164 00
E. W. Parsons.....	Laborer.....	2 00 per day	406 00		406 00
Warren Luther.....	Laborer.....	2 00 per day	84 00		84 00
H. S. Otman.....	Laborer.....	2 00 per day	142 00		142 00
Don A. Wilcox.....	Laborer.....	2 00 per day	104 00		104 00
J. G. Wynkoop.....	Laborer.....	2 00 per day	130 00		130 00
J. L. Ames.....	Laborer.....	2 00 per day	66 00		66 00
B. G. Priest.....	Laborer.....	2 00 per day	142 00		142 00
Thos. M. Lawrence.....	Laborer.....	2 00 per day	88 00		88 00
Wm. H. Davis.....	Laborer.....	2 00 per day	12 00		12 00
Harrison Weaver.....	Laborer.....	2 00 per day	2 00		2 00
H. G. Farmer.....	Laborer.....	2 00 per day	132 00		132 00
John P. Hooper.....	Laborer.....	2 00 per day	38 00		38 00
H. K. Kenyon.....	Laborer.....	2 00 per day	128 00		128 00
E. N. Burrows.....	Laborer.....	2 00 per day	104 00		104 00
Frank M. Stewart.....	Laborer.....	2 00 per day	112 00		112 00
Ward T. Marriott.....	Laborer.....	2 00 per day	124 00		124 00
C. S. Moyer.....	Laborer.....	2 00 per day	66 00		66 00
John O'Neil.....	Laborer.....	2 00 per day	120 00		120 00
W. E. Deuel.....	Laborer.....	2 00 per day	114 00		114 00
J. Freshman.....	Laborer.....	2 00 per day	116 00		116 00
Chas. H. Roberts.....	Laborer.....	2 00 per day	104 00		104 00
Geo. E. Bullis.....	Laborer.....	2 00 per day	72 00		72 00
Valier Mayhew.....	Laborer.....	2 00 per day	34 00		34 00
W. P. Rayland.....	Laborer.....	2 00 per day	32 00		32 00
Allen S. Field.....	Laborer.....	2 00 per day	18 00		18 00
James Mullaley.....	Laborer.....	2 00 per day	12 00		12 00
Elmo Quinn.....	Laborer.....	2 00 per day	20 00		20 00
R. C. Turner.....	Laborer.....	2 00 per day	32 00		32 00
Daniel Welch.....	Laborer.....	2 00 per day	28 00		28 00

\$43,285 01

Incidental Expenses.

Stationery and printing.....	\$11 92
Livery.....	2,161 00
Postage.....	58 67
Office rent.....	140 00
Telephone and telegraph.....	70 46
Miscellaneous.....	1,833 61
Total.....	4,275 66
Total.....	\$47,560 67

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

Name of road.	No.	Town.	County.	Total.
Norwich-Plymouth.....	112	Norwich and Plymouth...	Chenango...	\$2,443 18
Greene-Smithville Flats.....	218	Greene and Smithville...	Chenango...	1,332 30
Oxford-McDonough.....	224	Oxford, Preston and Mc- Donough.....	Chenango...	12 09
Blodgett Mills.....	111	Cortlandville.....	Cortland...	25 10
Dryden.....	215	Cortlandville.....	Cortland...	7 00
Burr's Mills.....	147	Watertown and Rutland..	Jefferson...	147 51
Watertown - Sacketts Har- bor-Henderson, section 1.....	181	Hounsfield.....	Jefferson...	571 81
Depot.....	186	Lyme.....	Jefferson...	328 86
Deerfield.....	3	Deerfield.....	Oneida...	40 00
Utica-Paris.....	71	New Hartford.....	Oneida...	97 57
Hamilton Bridge.....	139	Vernon.....	Oneida...	166 10
Seneca Turnpike.....	140	Vernon.....	Oneida...	367 84
Cortland Street.....	8	Onondaga.....	Onondaga...	680 84
James Street.....	9	Dewitt.....	Onondaga...	440 89
Fabius-Apulia, section 1.....	49	Fabius.....	Onondaga...	472 84
Marcellus-Marietta.....	74	Marcellus.....	Onondaga...	129 15
Fabius-Apulia, section 2.....	75	Fabius.....	Onondaga...	46 60
Fabius-Apulia, section 3.....	121	Fabius.....	Onondaga...	300 46
Genesee Turnpike.....	132	Geddes.....	Onondaga...	78 17
Total.....				\$7,688 31

North Salina Street Bridge, Syracuse.

Chapter 688, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Servitors.	Travel.	Total.
Guy L. Noble.....	Assistant engineer.....	\$5 00 per day	\$20 00.....		\$23 00
Edward M. Ellis.....	Draftsman.....	5 00 per day	5 00.....		5 00
Wm. A. Thurston.....	Laborer.....	2 00 per day	8 00.....	\$21 20	23 20
E. M. Bonner.....	Laborer.....	2 00 per day	8 00.....		8 00
Harry C. Webb.....	Laborer.....	2 00 per day	8 00.....		8 00
E. H. Campau.....	Laborer.....	2 00 per day	8 00.....		8 00
<i>Incidental Expenses.</i>					\$78 20
Fuel and light.....				\$6 00	
Miscellaneous.....				28 02	
Total.....					\$112 22

MIDDLE DIVISION: ENGINEERING EXPENSES.

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Cold Spring Bridge.

Chapter 581, Laws of 1903; Chapter 172, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
D. C. Wedgeworth.....	Assistant engineer.....	\$5 00 per day	\$40 00		\$40 00
Ernest W. Dalton.....	Laborer.....	2 00 per day	4 00		4 00
<i>Incidental Expenses.</i>					\$44 00
Postage				\$ 70	70
Total.....					\$44 70

Brasher Falls Dam—St. Regis River.

Chapter 729, Laws of 1904; Chapter 700, Laws of 1905; Chapter 230, Laws of 1906; Chapter 686, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Fred W. Sarr.....	First resident engineer.....	\$2,700 per year		\$21 66	\$21 66
David R. Lee.....	Assis'tant engineer.....	5 00 per day	\$165 00	1 58	166 58
<i>Incidental Expenses.</i>					\$188 24
Livery.....				\$2 00	
Postage.....				80	
Miscellaneous.....				36 10	
Total.....					\$223 64

State Court of Claims.

Chapter 723, Laws of 1904; Chapter 700, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Fred J. Wagner.....	Assis'tant engineer.....	\$6 00 per day	\$6 00	\$5 20	\$11 20
Geo. D. Williams.....	Assistant engineer.....	6 00 per day	18 00	13 14	31 14
D. E. Whitford.....	Assis'tant engineer.....	5 00 per day	510 00	5 00	515 00
E. C. Clark.....	Assis'tant engineer.....	5 00 per day	15 00	8 86	23 86
D. C. Wedgeworth.....	Assis'tant engineer.....	5 00 per day	130 00	41 88	171 88
L. D. Brownell.....	Assis'tant engineer.....	5 00 per day	449 00	186 53	635 53
E. J. Berry.....	Leveler.....	5 00 per day	85 00	80	85 80
Bernace B. Weber.....	Rodman.....	3 50 per day	63 00		63 00
W. J. Durkan.....	Rodman.....	3 50 per day	3 50		3 50
C. H. Mattison.....	Chainman.....	3 00 per day	12 00	6 85	18 85
Roy F. Hall.....	Chainman.....	2 50 per day	2 50		2 50
E. W. Parsons.....	Laborer.....	2 00 per day	58 00		58 00
J. A. Has'ell.....	Laborer.....	2 00 per day	54 00		54 00
F. H. Mongin.....	Laborer.....	2 00 per day	4 00		4 00
Wm. H. Davis.....	Laborer.....	2 00 per day	2 00		2 00
Walter B. Jewett.....	Laborer.....	2 00 per day	2 00		2 00
Ernest W. Dalton.....	Laborer.....	2 00 per day	30 00		30 00
W. J. Wilds.....	Laborer.....	2 00 per day	108 00		108 00
Geo. C. Hannon.....	Laborer.....	2 00 per day	4 00		4 00
<i>Incidental Expenses.</i>					\$1,849 26
Livery.....				\$131 85	
Telephone and telegraph.....				05	
Miscellaneous.....				22 94	
Total.....					\$2,004 10

Survey, Seneca River to Cayuga Lake.

Chapter 700, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Glenn D. Holmes.....	Engineer of water supply.....	\$2,400 per year	\$457 96	\$25 50	\$483 46
F. P. Williams.....	Assistant engineer.....	6 00 per day	192 00	189 47	381 47
A. J. Murray.....	Assistant engineer.....	5 00 per day	45 00	2 09	72 09
H. MacCulloch.....	Leveler.....	5 00 per day	210 00	253 65	463 65
Geo. D. Groves.....	Leveler.....	4 50 per day	202 50	1 30	203 80
Wm. W. Cronin.....	Leveler.....	4 50 per day	4 50		4 50
Arthur G. Cryslar.....	Rodman.....	3 50 per day	31 50		31 50
Carl F. Hopstein.....	Chainman.....	3 00 per day	3 00		3 00
Geo. C. Hannon.....	Laborer.....	2 00 per day	138 00		138 00
Harry E. Poole.....	Laborer.....	2 00 per day	110 00		110 00
C. R. DeGraff.....	Laborer.....	2 00 per day	228 00		228 00
Smith C. Bettinger.....	Laborer.....	2 00 per day	18 00		18 00
Michael Lenane.....	Laborer.....	2 00 per day	12 00		12 00
Frank E. Miller.....	Laborer.....	2 00 per day	94 00		94 00
E. E. Hedler.....	Laborer.....	2 00 per day	76 00		76 00
Patrick Doyle.....	Laborer.....	2 00 per day	26 00		26 00
W. D. Curtis.....	Laborer.....	2 00 per day	42 00		42 00
H. S. Otman.....	Laborer.....	2 00 per day	14 00		14 00
Wm. O. Bryan.....	Laborer.....	2 00 per day	28 00		28 00
Wm. W. Smith.....	Laborer.....	2 00 per day	28 00		28 00
Wm. Krugman.....	Laborer.....	2 00 per day	28 00		28 00
M. Martin.....	Laborer.....	2 00 per day	28 00		28 00
					\$2,483 47
<i>Incidental Expenses.</i>					
Stationery and printing.....				\$1 60	
Livery.....				252 25	
Fuel and light.....				2 50	
Postage.....				2 05	
Telephone and telegraph.....				3 35	
Miscellaneous.....				173 37	
					435 12
Total.....					\$2,928 59

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1. Erie canal, chapter 699, Laws of 1905	\$6,498 66
2. Oswego canal, chapter 699, Laws of 1905	425 40
3. Cayuga and Seneca canal, chapter 699, Laws of 1905.....	659 72
4. Black River canal, chapter 699, Laws of 1905	1,416 22

Construction of Barge Canal.

5. Construction of Barge canal, Erie canal, chapter 147, Laws of 1903....	74,509 45
6. Construction of Barge canal, Oswego canal, chapter 147, Laws of 1903....	16,619 11

Improvement of Public Highways.

7. Improvement of public highways, chapter 115, Laws of 1898; chapter 468, Laws of 1906.....	47,560 67
8. Maintenance and repairs of improved public highways, chapter 115, Laws of 1898; chapter 468, Laws of 1906; chapter 686, Laws of 1906.....	7,688 31

Special Work.

9. North Salina street bridge, Syracuse, chapter 688, Laws of 1906.....	112 22
10. Cold Spring bridge, chapter 581, Laws of 1903; chapter 172, Laws of 1905.....	44 70
11. Brasher Falls dam-St. Regis river, chapter 729, Laws of 1904; chapter 700, Laws of 1905; chapter 230, Laws of 1906; chapter 686, Laws of 1906.....	226 64

Special Surveys.

12. State Court of Claims, chapter 729, Laws of 1904; chapter 700, Laws of 1905.....	2,004 10
13. Survey, Seneca river to Cayuga lake, chapter 700, Laws of 1905.....	2,928 59
Total.....	\$160,693 79

TABLE OF CONTRACTS COMPLETED ON THE MIDDLE DIVISION DURING THE FISCAL YEAR ENDING SEPTEMBER, 30, 1906.

CONTRACTOR.	Date of contract.	Character of work.	Act.		Appropriation.	Contract price.	Final payment.
			Chap.	Year.			
Walter Bradley & Co..	June 3, 1902	Raising and completing high dam, Oswego river...	{ 645 394 632 594 729 230 }	{ 1901 1902 1904 1902 1904 1906 }	\$8,692 32	\$4,277 75	\$4,414 85
Wm. H. Welch.....	Sept. 13, 1904	Continuing improvement of harbor, Canandaigua lake.....	{ 594 632 729 230 }	{ 1904 1904 1904 1906 }	4,361 46	3,598 50	3,546 48
The King Bridge Co. and Rochester Bridge and Construction Co.....	Jan. 11, 1905 May 3, 1905	Cold Spring bridge, Seneca river, (Oswego canal).... *Superstructure of Willow street bridge, Oswego canal, Syracuse.	{ 591 172 }	{ 1903 1905 }	20,000 00	18,431 50	18,725 25
John Young.....	Jan. 18, 1906	†Making alterations to Weigh-lock building at Syracuse, N. Y.	{ 600 172 700 }	{ 1903 1905 1905 }	†19,000 00 5,000 00	13,259 20 4,144 70	13,413 85 4,482 70

*Substructure constructed by Superintendent of Public Works. †One-half appropriated by city of Syracuse.

Improvement of Public Highways.
Chapter 115, Laws of 1898.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
County of Broome..... Elisha W. Visser..... Casey and Murray.....	June 16, 1904 July 14, 1904 July 13, 1904	Chenango Tow-path road, No. 175, Broome county. Redwood-Alexandria Bay (Section 1) road, No. 182, Jefferson county. Greene-Smithville Flats road, No. 218, Chenango county.	\$0,998 50 23,490 00 33,605 00	\$12,267 20 27,876 00 35,106 07

TABLE OF CONTRACTS PENDING ON THE MIDDLE DIVISION, SEPTEMBER 30, 1906.

CONTRACTOR.	Date of contract.	Character of work.	Act.		Appropriation.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
			Chap.	Year.				
B. P. Clark	Aug. 22, 1906	Constructing a new apron and repairing State dam at Brasher Falls, N. Y.	729 700 230 886	1904 1905 1906 1906	\$5,510 03	\$5,038 25	\$5,038 25	\$2,007 00

Construction of Barge Canal.

Chapter 147. Laws of 1903.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
Empire Engineering Corporation.	April 18, 1905	Contract No. 4, Erie canal.	\$812,560 00	\$726,815 00	\$37,062 00
Empire Engineering Corporation.	April 18, 1905	Contract No. 5, Erie canal.	421,252 50	381,487 50	10,251 00
The Groton Bridge Co.	Aug. 10, 1906	Contract No. 7, Bridges on Sections 5 and 7, Erie canal.	39,893 30	38,125 80	.....
Mosier and Summers	June 7, 1906	Contract No. 10, Oswego canal.	1,149,988 00	1,126,718 00	1,998 00

Improvement of Public Highways.
Chapter 115, Laws of 1878; Chapter 468, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
County of Broome.....	June 16, 1904	Endicott road, No. 174, Broome county.....	\$22,500 00	\$19,900 00	\$17,551 80
County of Broome.....	June 16, 1904	Center Village road, No. 211, Broome county.....	5,000 00	4,749 00	2,051 57
County of Broome.....	June 16, 1904	Onaquaga road, No. 212, Broome county.....	9,350 00	8,249 00	6,310 49
County of Broome.....	June 16, 1904	River road, Windsor (section 2), No. 213, Broome county.....	25,900 00	22,999 00	25,667 49
County of Broome.....	June 16, 1904	River road, Windsor (section 1), No. 214, Broome county.....	16,450 00	12,794 00	11,399 46
Douglas V. Ashley.....	July 13, 1904	Gulford road, No. 225, Chenango county.....	50,000 00	41,348 00	37,541 15
Celestin C. Burns.....	July 7, 1906	Adams-Henderson (section 2) road, No. 234, Jefferson county.....	49,950 00	45,176 00	
Celestin C. Burns.....	July 7, 1906	Watertown-Sacketts Harbor (section 2) road, No. 235, Jefferson county.....	15,180 00	13,962 00	3,518 42
Brennan and O'Brien.....	July 9, 1906	Sacketts Harbor road, No. 237, Jefferson county.....	12,700 00	10,857 00	4,997 13
Celestin C. Burns.....	July 7, 1906	Henderson Harbor road, No. 238, Jefferson county.....	30,450 00	27,858 00	
Casey and Murray.....	July 10, 1906	Ulrica-Onelda Castle (section 1) road, No. 250, Onelda county.....	144,100 00	133,050 00	15,566 85
County of Broome.....	July 12, 1906	Deposit road, No. 265, Broome county.....	30,000 00	26,474 70	4,527 17
County of Broome.....	July 12, 1906	Tunnel road, No. 266, Broome county.....	13,750 00	13,319 00	
County of Broome.....	July 12, 1906	Castle creek road, No. 267, Broome county.....	54,750 00	54,662 70	7,871 43
County of Broome.....	July 12, 1906	Bridge road, No. 268, Broome county.....	10,150 00	9,053 68	5,377 89
County of Broome.....	Sept. 15, 1906	Ulrica-Onelda Castle (section 2) road, No. 271, Onelda county.....	86,500 00	79,800 00	
County of Broome.....	July 12, 1906	Gulf Bridge (section 1) road, No. 274, Broome county.....	15,250 00	14,406 28	
County of Broome.....	July 12, 1906	Union-Maine road, No. 275, Broome county.....	31,500 00	30,604 00	
The Barnett Contracting Co.....	July 12, 1906	Oswego-Sterling road, No. 280, Oswego county.....	13,500 00	12,700 00	
Wm. J. Dwyer.....	Aug. 31, 1906	South Salina street road, No. 290, Onondaga county.....	13,900 00	12,200 00	
Chas. H. Quereau.....	July 10, 1906	West Lake (section 2) road, No. 292, Onondaga county.....	10,550 00	9,350 00	472 50
Casey and Murray.....	July 10, 1906	Mohawk River road, Floyd, No. 293, Onondaga county.....	29,750 00	26,750 00	
Casey and Murray.....	July 10, 1906	Mohawk River road, Marcy, No. 295, Onondaga county.....	49,200 00	43,250 00	1,557 00
Casey and Murray.....	July 10, 1906	Mohawk River road, Deerfield, No. 297, Onondaga county.....	36,850 00	31,450 00	16,637 85
Wm. J. Dwyer.....	Aug. 31, 1906	Valley road, Marcellus, No. 328, Onondaga county.....	19,500 00	17,360 00	
County of Tompkins.....	Aug. 30, 1906	Cayuga Heights (section 2) road, No. 336, Tompkins county.....	37,400 00	33,182 00	
County of Tompkins.....	Aug. 30, 1906	Catskill turnpike (section 2) road, No. 338, Tompkins county.....	14,900 00	13,111 00	
Wm. J. Tyler.....	Sept. 18, 1906	Georgetown road, No. 349, Madison county.....	31,400 00	27,457 50	
Wm. J. Tyler.....	July 9, 1906	Collamer road, No. 348, Onondaga county.....	20,400 00	18,000 00	10,922 04
John H. Gordon.....	Aug. 28, 1906	Augusta road, Oriskany Falls, No. 369, Onelda county.....	30,600 00	28,000 00	
The Barnett Contracting Co.....	Sept. 18, 1906	Minetto road, No. 370, Oswego county.....	6,750 00	6,170 00	

TABLE OF CONTRACTS PENDING ON THE MIDDLE DIVISION, SEPTEMBER 30, 1906 — (Continued).

Improvement of Public Highways—(Continued).

Chapter 115, Laws of 1898: Chapter 468, Laws of 1906.

CONTRACTOR	Date of contract.	Character of Work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
County of Broome.....	July 12, 1906	Maine road, No. 374, Broome county.....	\$33,550 00	\$32,002 60	.....
County of Broome.....	July 12, 1906	Barker road, No. 375, Broome county.....	6,550 00	6,290 50	.....
Chas. H. Quereau.....	July 10, 1906	Cincinnati road, No. 377, Cortland county.....	4,000 00	3,650 00	\$3,186 45
John Weber and Sons.....	July 10, 1906	McGrawville road, No. 378, Cortland county.....	30,750 00	26,661 00	3,359 29
John Weber and Sons.....	Sept. 19, 1906	Harford road, No. 379, Cortland county.....	7,600 00	6,868 00	.....
Brayer Bros.....	July 10, 1906	Owasco road, No. 383, Cayuga county.....	21,500 00	18,000 00	6,804 00
County of Broome.....	July 12, 1906	Vestal road, No. 420, Broome county.....	35,600 00	35,287 18	.....
Wm. J. Semper.....	July 3, 1906	Adams-Watertown (section 2) road, No. 425, Jefferson county.....	26,100 00	24,000 00	.....
Colestin C. Burns.....	July 7, 1906	Watertown-Carthage (section 2) road, No. 427, Jefferson county.....	42,200 00	37,256 00	10,059 13
Wm. J. Dwyer.....	July 9, 1906	Thornison road, No. 429, Onondaga county.....	25,700 00	22,700 00	.....
J. Charles Dayton.....	July 20, 1906	Jordan Valley (section 1) road, No. 430, Onondaga county.....	15,200 00	13,797 00	9,437 15
J. Charles Dayton.....	July 20, 1906	Skaneateles-Spartford road, No. 431, Onondaga county.....	27,700 00	25,997 00	.....
M. F. Dollard.....	Aug. 20, 1906	Augusta road (Lowell and Spencer sections), No. 438, Oneida county.....	70,500 00	66,666 00	300 00
Douglas V. Ashley.....	July 10, 1906	Cortland-Groton (section 1) road, No. 446, Cortland county.....	11,100 00	9,782 00	.....
Wm. J. Dwyer.....	July 9, 1906	Cleero-South Bay road, No. 452, Onondaga county.....	33,100 00	28,937 93	.....
County of Tompkins.....	Aug. 30, 1906	Ithaca road, No. 454, Tompkins county.....	37,900 00	33,238 75	269 15
County of Tompkins.....	Aug. 30, 1906	Wyckoff road, No. 455, Tompkins county.....	4,500 00	3,851 25	.....
County of Tompkins.....	Aug. 30, 1906	Carlisle turnpike (section 3) road, No. 483, Tompkins county.....	35,655 25	35,655 25	.....
Wm. I. Tyler.....	July 6, 1906	Chittenango-Eagle Village road, No. 506, Madison county.....	44,400 00	19,000 00	4,446 00
Mott and Kemper.....	July 6, 1906	Oswego-Mexico (section 1) road, No. 509, Oswego county.....	21,700 00	19,000 00	.....
John Weber and Sons.....	July 16, 1906	Homer-Tully (section 1) road, No. 510, Cortland county.....	50,000 00	44,700 00	13,275 90
Chambers and Grady.....	Sept. 18, 1906	Albion-Elbridge road, No. 592, Cayuga county.....	29,366 00	25,770 00	.....
			55,400 00	47,000 00	.....

WATER RECORDS OF CAYUGA AND CROSS LAKES AND SENECA RIVER.
(See State Engineer's Report for 1905 for previous records.)

LOCATION.	1905. DECEMBER 9 AND 10 WATER.		1906. MARCH 9 AND 10. WATER.		1906. AUGUST 3 AND 4. WATER.		Remarks.
	Surface.	Depth.	Surface.	Depth.	Surface.	Depth.	
Cayuga lake.....	-8 408	10.7	-9 308	9.8	-7 758	11.3	Depth on lower miter-sill.
Mud lock.....	-8 634	10.5	-9 434	9.7	-8 034	11.1	Depth of river.
Canandaigua river, south of canal.....	-10 93	5.5	-11 300	5.0	-11 150	5.2	Depth on aqueduct foundation.
Seneca river aqueduct.....	-11 151	6.3	-11 451	5.8	-11 351	5.8	Depth of river.
Canandaigua river, north of canal.....	-11 326	5.8	-11 596	5.2	-11 456	5.3	Depth in channel.
West Shore railroad crossing.....	-11 411	4.6	-11 699	4.3	-12 009	4.1	Depth on bridge foundation.
N. Y. C. & H. R. R. crossing.....	-11 786	4.7	-12 116	4.5	-12 228	4.4	Depth in channel.
Mosquito Point.....	-13 756	5.4	-13 756	5.2	-14 406	4.0	Depth at iron bridge.
Cross lake.....	-14 817	20.0	-14 507	20.0	-15 567	19.2	



REPORT
OF THE
DIVISION ENGINEER
OF THE
WESTERN DIVISION

For the Fiscal Year Ending September 30, 1906.

WESTERN DIVISION.

STATE OF NEW YORK,
DEPARTMENT OF STATE ENGINEER AND SURVEYOR,
WESTERN DIVISION.

ROCHESTER, N. Y., *October 1, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor,*
Albany, N. Y.:

Dear Sir.—I have the honor of submitting the annual report of the Western Division for the year ending September 30, 1906.

No change has been made in the extent of the canal upon this Division during the past year.

The canal has been operated during the current twelve months without break or delay in navigation.

Such assistance as has been required has been furnished to the Department of Public Works.

Such legislative bills as have been referred to me have been investigated and reports made concerning them.

Assistance in the way of surveys and collection of data, etc., has been given the Attorney-General in the defense of suits before the Court of Claims, in the course of which a particularly thorough investigation has been made of the claims at the Tonawanda swamp, by Mr. D. D. Waldo, Resident Engineer.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

Work was continued at the various residencies and under the respective resident engineers, as follows:

Lyons Residency No. 8. From the west line of the town of Savannah to the west line of Wayne county, with office at Lyons, under E. V. R. Payne, Assistant Engineer, from September 30,

1905, to June 1, 1906, when the office was temporarily closed, and from July 23, 1906, to September 30, 1906, under F. P. Williams, Resident Engineer.

Rochester Residency No. 9. From the west line of Wayne county to the west line of Monroe county, under the direction of T. J. Morrison, Assistant Engineer.

Medina Residency No. 10-A. From the west line of Monroe county to 100 feet east of Gasport bridge, No. 151, with office at Medina, under D. D. Waldo, Resident Engineer.

Lockport Residency No. 10-B. From 100 feet east of Gasport bridge, No. 151, to the head of Sulphur Springs Guard-lock, with office at Tonawanda, under T. W. Barrally, Resident Engineer.

Tonawanda Residency No. 11. From the head of Sulphur Springs Guard-lock to Buffalo harbor, with office at Tonawanda, under T. W. Barrally, Resident Engineer.

RESIDENCY No. 8.

Mr. F. P. Williams reports the following work done on this residency.

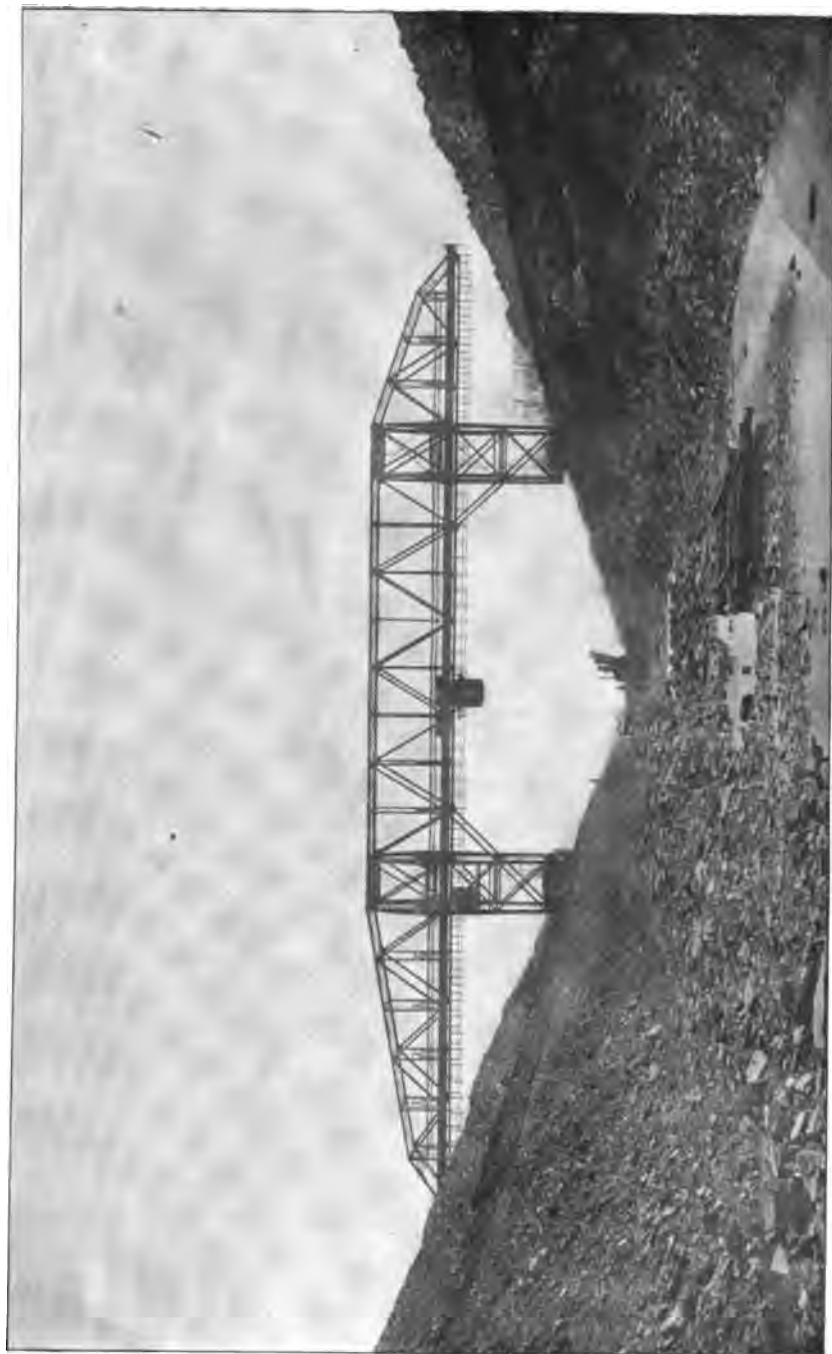
Work done while Mr. Payne had charge of this residency, from September 30, 1905, to June 1, 1906:

Topographical survey	8.2 sq. miles.
Drilling and boring	1,086.0 lin. ft.

The above work has been done from the west line of the town of Savannah and down the Clyde river as far as the north line of Seneca county, westward, through a distance of about 30 miles, to the west line of Wayne county.

The purpose of the survey was to develop the "Low level line." It is proposed by this line that the Barge canal follow the Clyde river west to Lyons, and from that point westward, to follow in the lowland along the route of the present canal, with the exception of the detour to the north at Newark. It is along this route, and with this proposed location in view, that the survey was made.

In addition to the information above outlined, soundings were taken at intervals and highwater marks were obtained. Gage stations for determining the height and the discharge of the Clyde river and Mud creek were established at Clyde, Lyons and at Newark.



BARGE CANAL, CONTRACT NO. 6.

View showing progress of excavation in prism ; grab machine at Station 2710.

All the information obtained was mapped to a scale of 1 in.=400 ft. Boring samples were taken at each hole, systematically labeled and preserved, in order to show the character of material encountered.

The above work was done by a small survey party, a small boring party and a small office force — a total of twelve men.

The following work was done since Mr. Williams assumed charge, on July 23, 1906:

The work has been confined to a study of the "Low level line." The additional survey information has included measurements of all railroad and highway structures along the route, and miscellaneous high water and other hydraulic data.

Borings. Additional bore-holes have been put down at projected lock locations and at other points. A total of 1,922 feet has been bored.

Gagings. The three gages, one at Clyde, one at Newark and one at Lyons, have been read once each day during the year.

Office. A projected location of the "Low level line" has been made the length of the entire residency, a profile drawn off from the maps and profiles made of all the highways and railroad crossings along the route. A preliminary report bringing out the main points governing the alignment and levels of the "Low level line" location has been completed.

Summary. The preliminary field work has been practically finished, and the locations and levels practically settled upon for proceeding with a preliminary estimate of the "Low level line."

Organization. The work has been done by a small survey and a small boring party — a total of eight men.

RESIDENCY No. 9.

The report of work done on this residency, under T. J. Morrison, First Assistant Engineer, follows, with the exception of the work done under contract No. 6, which has not been done under his direction:

This residency was formerly covered by Residencies 9-A and 9-B, but on March 14, 1906, these two residencies were merged into one and thereafter known as Residency No. 9.

The surveys of the section from King's Bend, near Pittsford, to the Genesee river — to be known as contract No. 23 — begun during the preceding year, were finished by a party under Mr. Frank T. Marsh, Assistant Engineer. Borings to determine the character of the soil were taken every 500 feet, except at the sites of the proposed locks, where they were taken 100 feet apart. From Clinton avenue to the Westfall road these holes were kept open and weekly readings were taken of the elevation of the ground water, covering a period from March 23 to June 14. Similar readings were taken in the wells in the vicinity. Maps, profile and cross-sections of this section were plotted and samples of the borings labeled and packed.

A survey was made of the Genesee river by a party under Messrs. Jas. E. Kelley and Frank T. Marsh, Assistant Engineers, from the Johnson and Seymour dam, near Court street, Rochester, to the old State Dam at Genesee Valley Park. This included a detailed survey of the Johnson and Seymour dam and soundings in the river from Court street to Elmwood avenue. A map was prepared showing the soundings and embracing the sites of the proposed guard-locks on either side of the river.

The surveys for contract No. 21, from the Genesee river to contract No. 6, were completed and plotted and contract drawings and estimate, except for bridges, were made.

The surveys of the section from contract No. 6 to the Monroe-Orleans county line, were completed under Messrs. Frank T. Marsh and H. J. Hemstreet, Assistant Engineers. Borings were made on the berme bank at intervals of 200 feet and rock soundings were taken on 100-foot sections. The cross-sections and borings, and a portion of the maps of this work, have been plotted. Mr. Hemstreet's party is now engaged in running out the blue lines, which work has been completed from South Greece to Spencerport.

Daily observations were taken of the three gages on the Genesee river, up to May 31, when the gage at Ballantine's Bridge was discontinued. Since that date the two remaining gages, one on the West Shore railroad bridge and the other at Elmwood avenue, have been read daily and the observations recorded.

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BARGE CANAL, CONTRACT NO. 6.
View showing bucket of grab machine.

Progress of work on Residency No. 9. Length, approximately, 37.74 miles.

From Wayne county line to King's Bend, approximately 10.30 miles.

- (1) Field work — None, except check levels.
- (2) Office work — None.

Contracts Nos. 22 and 23, King's Bend to Genesee river, 6.12 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — All done.
- (4) Office work, contract maps, etc.— None.

Contract No. 21, Genesee river to contract No. 6, 2.10 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — All done.
- (4) Office work, contract maps, etc.— All done except bridge plans.

Contract No. 6, 3.28 miles.

Under construction.

From Contract No. 6 to Orleans county line, 15.94 miles.

- (1) Field work, preliminary — 85 per cent done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — 40 per cent done.
- (4) Office work, contract maps, etc.— None.

Contract No. 6.

Mr. George T. Keith, Resident Engineer in charge, reports the following work done under him, by F. A. Maselli, contractor. This is the only contract work in force on this Division and extends from Station 2574+00, just south of Buffalo road west of Rochester, to Station 2744+00, near South Greece.

Cleaning	16.2 acres.
Grubbing	3,711 cu. yds.
All excavation	545,443 cu. yds.
Forming embankment	22,801 cu. yds.

The work has been done principally with a steam-shovel and incline. A bridge and grab-bucket have been installed and have been in commission since July 5, 1906, excavating rock.

RESIDENCY NO. 10-A.

The report of work done on this residency, under D. D. Waldo, follows:

FIELD WORK.

Borings (wash-drill) have been taken at intervals of about 200 feet along the berme side of the canal and at structures, from Albion to Monroe county line (11 miles). 2,518 lin. ft. have been bored, completing this work.

Rock soundings have been taken in prism of the canal, from Gasport to Middleport, and from Eagle Harbor to Monroe county line — 20 miles — completing this work on residency.

Cross-sections of prism and cross-sections of bridge approaches and at culverts, have been taken from $2\frac{1}{2}$ miles west of Holley to Eagle Harbor, covering a distance of about 11 miles, which completes this work on residency.

Topographic survey has been completed between Eagle Harbor and Monroe county line — 2.1 square miles — completing this work on residency.

Bench-levels have been run from $2\frac{1}{2}$ miles west of Holley to Eagle Harbor — 11 miles. This completes this work on residency.

Red-line survey has been made from Gasport to Middleport and from Eagle Harbor to Monroe county line — 20 miles — completing this work on residency.

Blue line has been staked out, from Gasport to Middleport and Eagle Harbor to Monroe county line — 20 miles. This completes this work of residency.

Monumenting base line has been completed from Monroe county line to Hindsburg — 6.6 miles.

Preliminary.

OFFICE WORK.

Cross-sections of prism, and cross-sections at bridges and culverts plotted, checked and inked, from Eagle Harbor to Monroe county line, a distance of 14.15 miles, completing this work on residency.

Topographic survey plotted on mounted maps from Eagle Harbor to Monroe county line — 2.1 square miles — completing this work on residency. (75 per cent above inked in.)

Blue line plotted from Gasport to Middleport and from Eagle Harbor to Albion, a distance of 10 miles.

OFFICE WORK, CONTRACT MAPS, ETC.

Contract maps and estimates of quantities of contract No. 9 revised, Eagle Harbor to Medina, have been made during the past year and were sent to Albany April 14, 1906.

Contract maps and estimate of quantities for the section, Medina to Middleport, have been completed, except the plan of the proposed crossing of the Oak Orchard gorge.

Summary of Work Done, October 1, 1905, to October 1, 1906.

FIELD.

Borings, 2,518 lin. ft.
Rock soundings in prism, 20 miles.
Cross-sections, prism (11 miles), 1,080 sections.
Cross-sections at 18 bridge approaches.
Cross-sections at 24 culverts.
Topographic survey, 2.1 sq. miles.
Bench-levels, 11 lin. miles.
Red-line survey, 20 lin. miles.
Blue line staked out, 20 lin. miles.
Monumenting base line, 6.6 miles.

OFFICE. Preliminary maps.

Cross-sections plotted, checked and inked, 1,080 sections.
Topography plotted, 2.1 sq. miles, 14 lin. miles.
Blue line plotted, 10 miles.

OFFICE. Contract maps and estimates.

Contract No. 9, Eagle Harbor to Medina, completed.
Medina to Middleport, 80 per cent completed.

Progress of Work on Residency No. 10-A. Length, 31.70 miles.

From Gasport to Middleport, 5.82 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — All done.
- (4) Office work, contract maps and estimate — None.

From Middleport to Medina, 6.04 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.

- (3) Office work, preliminary maps — All done.
- (4) Office work, contract maps, etc. — 80 per cent.

Contract No. 9, Medina to Eagle Harbor, 5.68 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — All done.
- (4) Office work, contract maps, etc. — All done.

From Eagle Harbor to Hindsburg, 7.60 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — 80 per cent done.
- (4) Office work, contract maps, etc. — None.

From Hindsburg to Monroe county line, 6.56 miles.

- (1) Field work, preliminary — All done.
- (2) Field work, appropriation surveys — None.
- (3) Office work, preliminary maps — 85 per cent done.
- (4) Office work, contract maps, etc. — None.

Reports of work done on Residencies 10-B and 11, in charge of T. W. Barrally, follow:

RESIDENCY No. 10-B.

On September 30, 1905, no work had been done on this residency. Surveys and borings were started in October and completed in April, 1906. Blue-line surveys were begun in May and completed in August. All field work is therefore now completed. The office work is progressing as follows:

Location maps plotted and inked and entirely completed except a part of the contours not yet put on. Cross-sections checked and plotted and prism outlines pencilled on same. Trial locations of entire residency are plotted on map and location of contract No. 40, extending from the head of Lockport locks to the Guard-lock at Sulphur Springs, is approved, subject to the further approval of the Advisory Board of Consulting Engineers.

Location maps of all bridges, culverts and structures have been plotted and tracings of these are nearly completed.

All information taken at Lockport for the design of new locks has been forwarded to Albany.

Progress of Work on Residency No. 10-B. Length, 11.72 miles.

Contract No. 40, Guard-lock, Sulphur Springs to head of Lockport locks, 5.24 miles.

All field work and borings completed.

Surveys mapped and cross-sections plotted.

Location made and waiting approval as to width of prism in long rock cut west of Lockport.

Lockport Locks.

Surveys and borings completed.

Plans for new locks to be completed in Albany.

From Lockport locks to Gasport, 6.48 miles.

All surveys, borings and field operations completed.

Surveys mapped and cross-sections and profile plotted.

Location made and approved.

Contract drawings and estimates now in progress.

RESIDENCY No. 11.

At the time of the last annual report work was well toward completion on this residency. Since that time the blue-line surveys have been completed and mapped. Contract plans and estimates have been completed and sent to Albany.

Concrete monuments have been set in base line from Tonawanda to Pickard's bridge, a distance of about six miles. This work is now in progress and will be completed in about six weeks.

Progress of Work on Residency No. 11. Length, 25.64 miles.

From Buffalo to Tonawanda, 12.64 miles.

No work to be done in this section.

From Tonawanda to mouth of Ellicott creek, 0.58 mile.

All field and office work completed.

Contract not advertised.

Plans and estimates completed.

Contract No. 19, Mouth of Ellicott creek to guard-lock, Sulphur Springs, 12.46 miles.

All field and office work completed.

Plans approved and contract let to the Great Lakes Construction Co., of Buffalo, N. Y.

No work completed under contract.

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Under chapter 115, Laws of 1898, and chapter 468, Laws of 1906.)

The winter of 1905 and 1906 was notable for the fact that there was very little snow on the ground and that the frost came entirely out of the ground some three or four times. This had a very damaging effect upon not only improved highways, but upon all highways and public improvements. City streets as well as macadam roads were very seriously damaged.

Owing to the probability that the State would take up the repair of the various highways under the Higbie-Armstrong law, and to the agitation regarding legislation to that end, very little in the way of repairs was done upon any of the improved roads by the various highway commissioners last spring. This neglect, together with the neglect which many of the roads had had in previous years, left a large amount of repair work to be done, and the repair work which was undertaken by this Department under chapter 468, Laws of 1906, amending chapter 115, Laws of 1898, and under chapter 686, Laws of 1906, making appropriation therefor, was begun with the knowledge that the appropriation was not sufficient to put all of the roads in perfect condition. Estimates were prepared for the placing of all the roads on this Division, (with the exception of those in Erie county, which are maintained under a contract entered into by the county and running for a period of five years) in good condition, and the work was advertised in the hope of doing same under contract. Bids, however, were few and disappointing. It was the first of September before this Department was in a position to go on with the repairs. An inadequate force of engineers, scarcity of labor and cars and other disappointments were encountered; however, most of the roads have been put in good condition to go through the coming winter. It is not claimed, however, that they are put in complete repair.

Owing to the shortage of engineers, it has been possible to maintain but one survey party in the field during the current season, with the result that petitions have accumulated and the demands of the various boards of supervisors on this Division, for road

plans, are importunate. Efforts will be made, as the road construction shuts down for the winter, and engineers become available, to meet these demands.

Owing to the lateness of the season when the contracts were awarded for the road construction, the amount of new work accomplished during the past season has been discouraging, together with the fact that none of the contractors have been able to secure an adequate amount of labor, and the scarcity of cars has delayed the laying of stone wherever a domestic product was not available.

The new standard section of wide wings has first been used upon this Division during the past season. While it provides a safe and easy method for drivers with fractious horses to leave the highway, the wide wings provided are badly cut up, especially where narrow tires predominate, by the traffic in wet weather, pending the growth of sods to protect them.

Section 19, of chapter 115, Laws of 1898, as amended, provides that street-surface railroads cannot be laid along roads improved under that act, excepting with the consent of the State Engineer. No restriction, however, is placed upon other public service corporations, such as telephone and telegraph companies, with their poles, water companies with their mains, local sewers, etc. The failure to regulate this has in many cases caused serious damage to the roads. One of the most beautiful roads out of Rochester, in the last two years has been made a causeway with lines of large telegraph poles extending along either side of the road and up to the earth shoulders. Local water companies have dug up other roads, damaged the shoulders and ruined the drainage ditches. I call your attention to the necessity of some legislation regulating this abuse.

Narrow tires continue to wreck improved roads. I have in mind a short stretch of highway completed in September, where the farmers were holding back their produce waiting for the completion of the road and then hauled from two to three tons upon 1½-inch tires. Inasmuch as the maintenance of these roads now becomes a State charge, with a fixed charge against the counties per mile per annum for such repairs, it seems unreasonable to expect the counties to adopt wide-tire laws to protect these roads,

but seems more rational that the State should adopt a wide-tire law, at least applicable to roads improved under the so-called Higbie-Armstrong law.

On July 1, 1906, residencies were established for the conduct of the Good Road work, at Canandaigua, under Mr. James E. Kelley, Resident Engineer, and at Buffalo, under Mr. E. V. R. Payne, Resident Engineer. The work of the Rochester residency has been looked after, and has been under the direction of Mr. M. W. Wilbur, First Resident Engineer.

Details of road construction work under contract for the past year are as follows:

CONTRACTS COMPLETED DURING THE YEAR END-
ING SEPTEMBER 30, 1906.

PENFIELD (SECTION 2) ROAD, No. 167, MONROE COUNTY, N. Y.

Length, 5.313 miles.

Width of macadam, 12, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering (revised), \$31,700.

Contract dated, June 17, 1904.

Work commenced, August 1, 1904.

Work completed, October 1, 1905.

Final account, \$30,686.45.

Contractor, Henry P. Burgard.

Engineer in charge, I. O. Cole.

This road extends from the four corners at Penfield, easterly to the west line of Wayne county and completes an improved road from Rochester to the east line of Monroe county.

Local boulders, crushed along the site, were used in the construction of this road. Granite was used for the top and largely throughout the bottom, a small amount of sandstone being mixed in with the bottom course.

PORTLAND AVENUE (SECTION 1) ROAD, No. 172, MONROE
COUNTY, N. Y.

Length, 0.703 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$7,800.

Contract dated, October 15, 1904.

Work commenced, August 3, 1905.

Work completed, June 2, 1906.

Final account, \$6,585.96.

Contractor, Frederick A. Brotsch.

Engineer in charge, T. J. Love.

This improvement extends from the northerly boundary of Rochester to the Ridge road, in the town of Irondequoit, and was practically completed during the season of 1905. The only work to be done during the past year was the cleaning and trimming up, owing to the fact that the stone work was completed after October 15, 1905, and was carried through the winter by the contractor, in accordance with the practice of not accepting roads where the stone work was completed after the 15th day of October. This road was built throughout with Rochester limestone.

EAST SIDE-LAKE (SECTION 1) ROAD, No. 190, ONTARIO COUNTY,
N. Y.

Length, 2.368 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$18,700.

Contract dated, June 10, 1904.

Work commenced, September 18, 1904.

Work completed, October 15, 1905.

Final account, \$16,889.24.

Contractors, Mott and Kemper.

Engineers in charge, Arthur S. Whitbeck and George G. Miller.

This road extends from the south line of the town of Canandaigua, southerly to Deep Run, and was constructed of local granite boulders, crushed along the site.

HONEYE-HEMLOCK ROAD, No. 191, ONTARIO COUNTY, N. Y.

Length, 4.549 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$39,000.

Contract dated, June 17, 1904.

Work commenced, April 29, 1905.

Work completed, October 1, 1905.

Final account, \$35,377.42.

Contractors, Mosier and Summers, Inc.

Engineers in charge, E. P. Strowger and Chas. M. Edwards.

This road extends from the east line of Livingston county and runs easterly through Honeoye to the road running along the east side of Honeoye lake. No work was done on this road during the season of 1904, owing to the inability of the contractor to procure the boulders from the fields until the crops were harvested. Local granite boulders, crushed along the site of the road, were used throughout.

This road, before improvement, was almost impassable owing to the sticky nature of the subgrade and the excessive grades, which have been reduced to a maximum of 7 per cent. Much benefit is derived by the improvement of this road, as Honeoye lacks railway facilities, and all of the merchandise and farm produce shipped out has to pass over this highway.

GENEVA-CANANDAIGUA (SECTION 2) ROAD, No. 207, ONTARIO COUNTY, N. Y.

Length, 6.213 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$55,000.

Contract dated, July 14, 1904.

Work commenced, July 17, 1905.

Work completed, August 11, 1906.

Final account, \$49,387.02.

Contractor, Henry P. Burgard.

Engineer in charge, John P. Kelley.

This improvement extends from the east line of the town of Hopewell, westerly to the east line of the village of Canandaigua, in the towns of Hopewell and Canandaigua, and was built of local granite, crushed along the site, laid in two three-inch courses after rolling. This road was essentially completed in the fall of 1905, but the contract was carried into 1906, owing to the necessity for putting in a large culvert which it had not previously been expected to rebuild.

CONTRACTS PENDING SEPTEMBER 30, 1906.

REED'S CORNERS ROAD, No. 206, ONTARIO COUNTY, N. Y.

Length, 2.67 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,000.

Contract dated, July 10, 1906.

Work commenced, August 6, 1906.

Work completed, 38 per cent.

Contractor, John Johnson.

Engineer in charge, John S. Clancy.

This improvement extends from its junction with the Geneva-Canandaigua road, southerly a distance of 2.67 miles, in the towns of Hopewell and Gorham, and is being built of local granite laid in three courses.

GRISWOLD STREET ROAD, No. 251, NIAGARA COUNTY, N. Y.

Length, 3.15 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$18,400.

Contract dated, July 5, 1906.

Work commenced, July 12, 1906.

Work completed, 92 per cent.

Contractors, Mosier and Summers.

Engineer in charge, Edwin M. Secrist.

This improvement extends from the Telegraph road 3.15 miles southerly, in the town of Royalton, and is being built in two equal courses, 3 inches thick when rolled, of local limestone crushed along the road. Good progress is being made and it is expected that this road will be completed during the current year.

CLIFTON (SECTION 2) ROAD, No. 252, MONROE COUNTY, N. Y.

Length, 2.92 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$22,200.

Contract dated, July 11, 1906.

Work commenced, July 30, 1906.

Work completed, 77 per cent.

Contractor, Frederick A. Brotsch.

Engineer in charge, George G. Miller.

This improvement extends from the village of Chili, westerly to Buckbees Corners, in the town of Chili, and is being built of two equal courses of Akron limestone, 3 inches thick when rolled, and should be essentially completed during the current season.

LYELL ROAD, No. 253, MONROE COUNTY, N. Y.

Length, 2.12 miles.

Width of macadam, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, \$22,000.

Contract dated, July 11, 1906.

Work not started.

Contractor, Frederick A. Brotsch.

This improvement extends from the westerly boundary of the city of Rochester westerly to the Spencerport road, in the town of Gates, and will be built of local limestone laid in two equal courses, 3 inches thick when rolled. Nothing has been done as yet upon this contract, owing to the fact that the contractor is working on roads in the town of Chili.

CHILI (SECTION 1) ROAD, No. 254, MONROE COUNTY, N. Y.

Length, 3.11 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$27,700.

Contract dated, July 11, 1906.

Work not started.

Contractor, Frederick A. Brotsch.

This improvement extends from the westerly boundary of the city of Rochester southwesterly to the line between the towns of Gates and Chili, in the town of Gates.

Nothing has been done on this road owing to the fact that the contractor is working his plant in other localities.

The plans contemplate the building of this road in two equal courses of limestone, 3 inches thick when rolled.

CHILI (SECTION 2) ROAD, No. 255, MONROE COUNTY, N. Y.

Length, 2.56 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$26,000.

Contract dated, July 11, 1906.

Work not started.

Contractor, Frederick A. Brotsch.

This improvement extends from the southerly line of the town of Gates, southwesterly to the village of Chili, in the town of Chili, and will be built in two equal courses of limestone, 3 inches thick when rolled.

Nothing has been done on this road owing to the fact that the contractor is working his plant in other localities.

Upon the completion of Roads Nos. 253, 254 and 255, this will give a continuous improved road from Buckbees Corners to the city of Rochester.

LITTLE RIDGE (SECTION 3) ROAD, No. 256, MONROE COUNTY, N. Y.

Length, 3.60 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$28,800.

Contract dated, July 13, 1906.

Work not started.

Contractor, Greece Construction Co.

This improvement extends from the Spencerport-Hilton road, westerly to the west line of the town of Parma, and is to be built with a bottom course of local stone 3 inches thick; a middle course of local granite boulders 3 inches thick when rolled and a top course of local granite 1 inch thick when rolled.

Nothing has been done on this road. The contractor will gather the local fieldstone during the winter and progress the construction of this road during the coming spring.

LITTLE RIDGE (SECTION 4) ROAD, No. 257, MONROE COUNTY,
N. Y.

Length, 3.36 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$28,100.

Contract dated, July 11, 1906.

Work not started.

Contractor, Frederick A. Brotsch.

This improvement extends from the west line of the town of Parma westerly to the village of Clarkson, in the town of Clarkson, and will be built with a bottom course of local stone 3 inches thick when rolled; a middle course of local granite boulders 3 inches thick when rolled, and a top course of local granite 1 inch thick when rolled.

No work had been done upon this road, as the contractor expects to gather the local fieldstone during the winter and progress the construction of this road during the coming spring.

The construction of Roads Nos. 256 and 257 will provide a continuous improved road from Rochester to Brockport, by way of Clarkson.

AURORA-BUFFALO (SECTION 2) ROAD, No. 263, ERIE COUNTY,
N. Y.

Length, 4.23 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$42,400.

Contract dated, July 18, 1906.

Work not started.

Contractor, Gantz-Wilson Construction Co.

This improvement extends from the easterly line of the town of West Seneca to the northerly line of the town of Aurora, in the town of Elma.

The plans contemplate the construction of this road with a limestone or local stone base and a limestone top. No work has been done upon same.

AURORA-BUFFALO (SECTION 3) ROAD, No. 264, ERIE COUNTY,
N. Y.

Length, 0.74 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$6,900.

Contract dated, July 10, 1906.

Work not started.

Contractor, County of Erie.

This improvement extends from the southerly line of the town of Elma to the village of East Aurora, in the town of Aurora, and will be built with a limestone or local stone base and a limestone top. No work has been done upon this road.

The construction of Roads Nos. 263 and 264 will complete an improved highway from Buffalo to East Aurora.

HILTON ROAD, No. 269, MONROE COUNTY, N. Y.

Length, 4.30 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$28,000.

Contract dated, July 11, 1906.

Work not started.

Contractor, Frederick A. Brotsch.

This improvement extends from the Little Ridge road northerly to the village of Hilton, in the town of Parma, and will be built with a local stone base and granite middle and granite top courses. Nothing has been done on this construction.

The contractor will gather the local stone from the fields during the coming winter, so that work may progress in the spring.

ORCHARD PARK (SECTION 5) ROAD, No. 272, ERIE COUNTY,
N. Y.

Length, 1.21 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$13,700.

Contract dated, July 10, 1906.

Work commenced, July 11, 1906.

Work completed, 80 per cent.

Contractor, John Johnson.

Engineer in charge, C. H. Fosdick.

This improvement extends from the village of Orchard Park to the village of Duels Corners, in the town of East Hamburg, and will be built of limestone from the Barber Asphalt Company's quarries at North Buffalo. This is an extension of the Orchard Park road leading from Buffalo to Orchard Park, improving a stretch of what was before a very bad road. It is expected that this work will be completed this season. The contractor started with much vigor and undoubtedly would have had this road completed by the 1st of October had he not been delayed by the construction of an undergrade crossing by the B. R. & P. R. R.

BARNARDS CROSSING (SECTIONS 1 AND 2) ROAD, No. 276, MONROE COUNTY, N. Y.

Length, 4.14 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$39,400.

Contract dated, July 13, 1906.

Work commenced, August 13, 1906.

Work completed, 27 per cent.

Contractor, Greece Construction Co.

Engineer in charge, George G. Miller.

This improvement extends from the northerly line of the city of Rochester northerly to the Latta road, in the town of Greece. The bottom course of this road will consist of local stone (sandstone and granite boulders), and the top course of limestone from Le Roy.

The completion of this road will make a much needed improved highway from the city of Rochester to Charlotte. However, this road will not be entirely available until the city of Rochester has improved about half a mile of Dewey avenue, leading to it. The road can be reached from Rochester by way of the Ridge road.

GENEVA-CANANDAIGUA (SECTION 3) ROAD, No. 333, ONTARIO
COUNTY, N. Y.

Length, 1.09 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, \$9,400.

Contract dated, July 10, 1906.

Work commenced, August 6, 1906.

Work completed, 77 per cent. .

Contractor, Henry C. Schroeder.

Engineer in charge, Arthur S. Whitbeck.

This improvement extends from the west line of the town of Geneva to the west line of the city of Geneva, in the town of Geneva, and will be constructed entirely of limestone. This will complete an improved highway from Canandaigua through to Geneva.

This road will undoubtedly be completed during the current season.

LYONS-GENEVA ROAD, No. 334, ONTARIO COUNTY, N. Y.

Length, 1.69 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$15,716.

Contract dated, July 10, 1906.

Work commenced, September 24, 1906.

Work completed, 3 per cent.

Contractor, Henry C. Schroeder.

Engineer in charge, Arthur S. Whitbeck.

This improvement extends from the north line of the city of Geneva northerly to the crossroads in the towns of Geneva and Phelps, and will be built entirely of limestone. While it is not expected that the road will be entirely completed this season, it is expected that very material progress will be made.

VICTOR-MENDON (SECTION 1) ROAD, No. 335, ONTARIO COUNTY,
N. Y.

Length, 5.20 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$12,500.

Contract dated, July 5, 1906.

Work commenced, August 6, 1906.

Work completed, 17 per cent.

Contractors, Mosier and Summers.

Engineer in charge, Jos. W. Howe.

This improvement extends from the east line of the town of Victor to the west line of Ontario county, except through the village of Victor, in the town of Victor. This road will be built with a limestone or local stone base and a limestone top.

ERIN-HORSEHEADS ROAD, No. 356, CHEMUNG COUNTY, N. Y.

Length, 9.22 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$102,000.

Contract dated, July 7, 1906.

Work commenced, July 30, 1906.

Work completed, 20 per cent.

Contractors, Bovier and Rawlins.

Engineer in charge, John P. Kelley.

This road extends from the east line of the village of Horseheads easterly to Mills street, near the village of Erin, in the towns of Erin and Horseheads, and will be built entirely of limestone.

About three miles of this road have been completed and the contractors have made excellent progress, when the fact is taken into consideration that they had no plant nor appliances when the contract was let to them.

GRAND CENTRAL AVENUE ROAD, No. 357, CHEMUNG COUNTY, N. Y.

Length, 1.57 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$16,400.

Contract dated, September 13, 1906.

Work not started.

Contractors, Costello and Neagle.

This improvement extends from the city of Elmira to Elmira Heights, and from Elmira Heights to the village of Horseheads, in the town of Horseheads, and will be built with a limestone or local stone base and a trap-rock top. The contract was let so late in the season that the contractors will not begin work until spring.

CLINTON STREET (SECTION 1) ROAD, No. 371, ERIE COUNTY,
N. Y.

Length, 5.65 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$55,900.

Contract dated, July 18, 1906.

Work commenced, August 6, 1906.

Work completed, 3 per cent.

Contractor, Gantz-Wilson Construction Co.

Engineer in charge, W. T. Huber.

This improvement extends from the east line of the city of Buffalo 5.65 miles easterly to the west line of the town of Elma, in the towns of Cheektowaga and West Seneca, and will be built entirely of limestone.

The contractors for this road have a number of other road contracts and had no plant at the time the contracts were awarded to them. They promptly began excavation and grading and completed about 2 miles of subgrade, but were unable to get their crushing plant in operation, so as to do much of anything in the way of laying stone during the current year.

These contractors are trying a new plan in the delivery of stone; that is, the bringing of the stone to the work on narrow-gage rail. The success of this will be watched with much interest.

CLINTON STREET (SECTION 2) ROAD, No. 372, ERIE COUNTY,
N. Y.

Length, 6.14 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$61,500.

Contract dated, July 18, 1906.

Work not started.

Contractor, Gantz-Wilson Construction Co.

This improvement extends from the east line of the town of West Seneca easterly to the west line of the town of Marilla, in the town of Elma, and will be built entirely of limestone. No work has been done upon the road.

GOODRICH ROAD, No. 373, ERIE COUNTY, N. Y.

Length, 8.77 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$84,400.

Contract dated, July 9, 1906.

Work not started.

Contractor, Wm. E. Baldwin & Co.

This improvement extends from the Main Street road to Tonawanda creek, in the town of Clarence, and will be built entirely of local limestone. Nothing has as yet been done, as the contractors are using their plant in other localities.

FIVE CORNERS-KUCKVILLE (SECTION 1) ROAD, No. 386,
ORLEANS COUNTY, N. Y.

Length, 3.47 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$21,300.

Contract dated, August 31, 1906.

Work not started.

Contractor, Thomas Hucknall.

This improvement extends from the Oak Orchard road at Five Corners, northwesterly to the north line of the town of Gaines, in the town of Gaines, and will be built of local stone.

The contractor is making preparations for starting the concrete culverts this fall and will gather local stone during the winter, so as to make rapid progress during the coming spring.

FIVE CORNERS-KUCKVILLE (SECTION 2) ROAD, No. 387,
ORLEANS COUNTY, N. Y.

Length, 5.80 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$41,500.

Contract dated, August 31, 1906.

Work not started.

Contractor, Thomas Hucknall.

This improvement extends from the south line of the town of Carlton northerly to Johnson's creek, in the town of Carlton, and will be built of local stone throughout.

The contractor expects to start the concrete culverts this fall and will gather the local stone during the winter, so as to make rapid progress during the coming spring.

KENDALL CORNERS ROAD, No. 388, ORLEANS COUNTY, N. Y.

Length, 3.43 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$24,900.

Contract dated, July 9, 1906.

Work not started.

Contractors, Chambers and Grady.

This improvement extends from the line between the towns of Murray and Kendall, northerly to the R. W. & O. R. R. crossing, in the town of Kendall.

This road will be built in three courses, with a local stone base and granite middle and top courses. The contractor's plant is employed on Road No. 484 and nothing has been done on this road. Local stone will be gathered during the winter so as to make suitable progress during the coming spring.

SUSPENSION BRIDGE-LEWISTON ROAD, No. 475, NIAGARA COUNTY,
N. Y.

Length, 2.42 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$25,500.

Contract dated, September 8, 1906.

Work commenced, September 19, 1906.

Work completed, 6 per cent.

Contractor, The Good Roads Construction Co.

Engineer in charge, Wm. C. Perkins.

This improvement extends from the city line of Niagara Falls northerly to the R. W. & O. R. R. crossing, near the village line of Lewiston, in the town of Lewiston, and will be built of local limestone. The contractor is employed taking out the very deep rock cut at the northerly end, over the Niagara escarpment.

DANSVILLE-MT. MORRIS (SECTION 3) ROAD, No. 482, LIVINGSTON COUNTY, N. Y.

Length, 2.23 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$25,000.

Contract dated, July 11, 1906.

Work commenced, July 23, 1906.

Work completed, 42 per cent.

Contractors, McCarthy and Simerson.

Engineer in charge, B. E. Moses.

This road extends from the west line of the town of Groveland, northwesterly to the village of Mt. Morris, in the town of Mt. Morris, and will be built with a bottom course partially of Le Roy and Portage Falls stone and with a top course of Le Roy limestone.

The contractors got to work promptly, but have seemed to meet with insurmountable difficulties in getting stone delivered. The road will probably be completed during the current year.

CANANDAIGUA-VICTOR ROAD, No. 484, ONTARIO COUNTY, N. Y.

Length, 6.79 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$51,000.

Contract dated, July 9, 1906.

Work commenced, July 18, 1906.

Work completed, 34 per cent.

Contractors, Chambers and Grady.

Engineer in charge, Chas. A. Carruth.

This improvement extends from the north line of the village of Canandaigua northwesterly to the east line of the town of Victor, in the towns of Canandaigua and Farmington, and is being built with limestone from a local quarry at Hathaways. Satisfactory progress is being made, although the road will probably not be completed during the current season.

TRANSIT (SECTION 3) ROAD, No. 507, NIAGARA COUNTY, N. Y.

Length, 4.68 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$48,000.

Contract dated, July 9, 1906.

Work commenced, August 6, 1906.

Work completed, 24 per cent.

Contractor, Wm. E. Baldwin & Co.

Engineer in charge, C. J. Bean.

This improvement extends from the south line of the city of Lockport southerly to Tonawanda creek, in the towns of Lockport and Pendleton, and is being built entirely of Lockport limestone.

The completion of this road will make an improved road all the way from Lockport to Buffalo, as well as doing away with what has been a stretch of most abominable roadway. The contractors are hauling stone with the use of a traction engine and large cars, carrying about 7 cubic yards.

CLARENCE-HUNTS CORNERS ROAD, No. 522, ERIE COUNTY, N. Y.

Length, 4.75 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, \$41,000.

Contract dated, June 30, 1906.

Work commenced, July 20, 1906.

Work completed, 46 per cent.

Contractor, Fred Knickenberg.

Engineer in charge, Harry D. Waldo.

This improvement extends from the Main Street road at Clarence northerly to Mansfield's Corners, in the town of Clarence, and is being built throughout with limestone, from the quarries at Akron and Clarence. It is expected that about one-half of this road will be completed during this season.

HAMBURG-NORTH COLLINS ROAD, No. 523, ERIE COUNTY, N. Y.

Length, 8.86 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$114,900.

Contract dated, July 9, 1906.

Work not started.

Contractor, Wm. E. Baldwin & Co.

This improvement extends from the south line of the village of Hamburg southwesterly to the north line of the town of North Collins, in the towns of Hamburg and Eden, and will be built entirely of limestone.

The contractors for this road had no plant at the time their contracts were received and were the successful bidders of a considerable mileage. Their plant is now employed on the Transit road. They are making preparations to begin the construction of this road early in the spring of 1907.

EAST PEMBROKE-BATAVIA ROAD, No. 586, GENESEE COUNTY, N. Y.

Length, 5.58 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, \$49,000.

Contract dated, June 30, 1906.

Work not started.

Contractor, Frederick W. Knickenberg.

This improvement extends from the west village line of Batavia westerly to the east line of the town of Pembroke, in the town of Batavia, and will be built entirely of limestone. The contractor has commenced the construction of the concrete culverts and is opening up a quarry so as to begin laying the metaling in the spring.

IMPROVEMENT OF PUBLIC HIGHWAYS.

Recapitulation of Work Done to September 30, 1906.

COUNTY.	Miles under contract during year ending Sept. 30, 1906.	Miles of plans and estimates completed prior to Sept. 30, 1906.	Miles of plans and estimates completed prior to Sept. 30, 1906.	Miles of plans and estimates completed during year ending Sept. 30, 1906.	Miles of surveys made during year ending Sept. 30, 1906.	Miles of contracts completed prior to Sept. 30, 1906.	Miles of contracts completed prior to Sept. 30, 1906.	Miles of contracts completed during year ending Sept. 30, 1906.
Allegany.....		13.03	13.03		43.37			
Cattaraugus.....		1.05	1.05					
Cattaraugus.....	10.79	30.53	45.16	14.63		8.09	8.09	
Chemung.....	40.35	132.90	154.95	22.05	4.65	53.18	53.18	
Erie.....	5.58	5.58	5.58		19.06			
Genesee.....	2.23	31.33	31.33					
Livingston.....	43.66	*235.53	*243.36	7.83		87.06	87.77	0.71
Monroe.....	10.25	10.25	15.05	4.80				
Niagara.....	42.34	69.63	76.53	6.90		22.07	32.83	10.76
Ontario.....	12.69	*64.93	*64.93					
Orleans.....								
Schuyler.....		15.09	15.09					
Steuben.....		1.99	1.99		36.40			
Wayne.....					43.38			
Wyoming.....		10.41	10.41					
Yates.....								
	167.89	622.25	678.46	56.21	146.84	170.40	181.87	11.47

*County line road, 5.55 miles long, appears in both counties.

There has been a marked shortage in engineering assistance throughout the year, especially upon the road work. There never has been a time when I have had a sufficient number of engineers.

I am indebted to Mr. M. W. Wilbur, First Resident Engineer, for his able and conscientious co-operation in all the work, and to the various Resident Engineers and subordinates, for their fidelity and zeal at all times in the carrying on of their work.

In closing, I desire to thank you and your Deputies for the consideration shown me.

Respectfully submitted,

A. J. ROCKWOOD,

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS EMPLOYED IN THE WESTERN DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES, FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1906.

Ordinary Repairs to Canals — Erie Canal.

Chapter 690, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. J. Rockwood.....	Division engineer.....	\$3,600 per year	\$3,600 00	\$22 06	\$3,622 06
M. W. Wilbur.....	Resident engineer.....	2,400 per year	633 90	42 40	676 30
Chas. M. Edwards.....	Assistant engineer.....	6 00 per day	12 00	3 00	15 00
Chas. M. Edwards.....	Assistant engineer.....	5 00 per day	130 00	2 80	132 80
Frank T. Marsh.....	Assistant engineer.....	6 00 per day	12 00	2 00	14 00
George G. Miller.....	Assistant engineer.....	5 00 per day	15 00		15 00
George G. Miller.....	Leveler.....	4 50 per day	9 00		9 00
E. P. Strowger.....	Leveler.....	4 50 per day	9 00		9 00
J. B. Barrett.....	Leveler.....	5 00 per day	460 00		460 00
Frank W. Bristow.....	Draftsman.....	5 00 per day	10 00		10 00
E. P. Strowger.....	Rodman.....	3 50 per day	28 00		28 00
John P. Kelley.....	Rodman.....	3 50 per day	7 00		7 00
R. T. Webster.....	Rodman.....	4 00 per day	312 00		312 00
B. E. Moses.....	Rodman.....	3 50 per day	7 00		7 00
E. A. Bonney.....	Rodman.....	4 00 per day	8 00		8 00
A. B. Chappell.....	Chainman.....	3 00 per day	6 00		6 00
B. E. Moses.....	Chainman.....	2 50 per day	12 50		12 50
C. G. Harger, Jr.....	Financial clerk.....	5 00 per day	695 00		695 00
A. B. Williams.....	Estimate clerk.....	4 50 per day	558 00		558 00
A. B. Williams.....	Estimate clerk.....	4 00 per day	60 00		60 00
F. V. Searls.....	Estimate clerk.....	4 00 per day	4 00		4 00
Anna M. Lorscheider.....	Stenographer.....	1,000 per year	377 78		277 78
Anna M. Lorscheider.....	Stenographer.....	75 00 per month	262 50		262 50
W. S. Cameron.....	Laborer.....	2 00 per day	4 00		4 00
H. G. Eckler.....	Laborer.....	2 00 per day	4 00		4 00
Thos. J. Love.....	Laborer.....	2 00 per day	4 00	1 00	5 00
Arthur E. Williams.....	Laborer.....	2 00 per day	4 00		4 00
Adalbert G. Clark.....	Laborer.....	2 00 per day	100 00	1 88	101 88
Theobald M. Quinn.....	Laborer.....	2 00 per day	24 00		24 00
Henry Engler.....	Laborer.....	2 00 per day	22 00		22 00
					\$7,365 91
<i>Incidental Expenses.</i>					
Stationery and printing.....				\$136 35	
Postage.....				115 18	
Office rent.....				660 00	
Telegraph and telephone.....				143 27	
Miscellaneous.....				579 29	
					1,634 09
Total.....					\$9,000 00

Construction of Barge Canal—Erie Canal.

Chapter 147, Laws of 1903.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. J. Rockwood.....	Division engineer.....	\$3,600 per year.....		\$100 26	\$100 26
George T. Keith.....	Resident engineer.....	2,400 per year.....	\$2,400 00	14 10	2,414 10
T. W. Barrally.....	Resident engineer.....	2,400 per year.....	2,400 00	166 64	2,566 64
D. D. Waldo.....	Resident engineer.....	2,400 per year.....	800 00	62 33	962 33
F. P. Williams.....	Resident engineer.....	2,400 per year.....	458 06	33 00	491 06
T. J. Morrison.....	First assistant engineer.....	7 00 per day.....	469 00	7 35	476 35
T. J. Morrison.....	Assistant engineer.....	6 00 per day.....	606 00	31 15	637 15
D. D. Waldo.....	Assistant engineer.....	6 00 per day.....	1,011 00	47 88	1,058 88
E. V. R. Payne.....	Assistant engineer.....	6 00 per day.....	1,242 00	47 29	1,289 29
H. J. Hems'reet.....	Assistant engineer.....	6 00 per day.....	936 00	137 04	1,073 04
James E. Kelley.....	Assistant engineer.....	6 00 per day.....	312 00	19 70	331 70
Chas. A. Ingersoll.....	Assistant engineer.....	6 00 per day.....	918 00	43 84	961 84
Frank T. Marsh.....	Assistant engineer.....	6 00 per day.....	612 00	23 90	635 90
Chas. M. Edwards.....	Assistant engineer.....	5 00 per day.....	80 00	3 85	83 85
H. J. Hems'reet.....	Assistant engineer.....	5 00 per day.....	780 00	69 97	849 97
James E. Kelley.....	Assistant engineer.....	5 00 per day.....	780 00	217 04	997 04
C. J. McDonough.....	Assistant engineer.....	5 00 per day.....	720 00	185 00	905 00
Chas. A. Ingersoll.....	Assistant engineer.....	5 00 per day.....	765 00	18 71	783 71
Frank T. Marsh.....	Assistant engineer.....	5 00 per day.....	1,045 00	145 74	1,190 74
G. G. Undrhill.....	Assistant engineer.....	5 00 per day.....	303 49	51 85	355 34
Isaac O. Cole.....	Assistant engineer.....	6 00 per day.....	522 00	122 66	644 66
Edward Anderberg.....	Assistant engineer.....	5 00 per day.....	390 00	174 75	564 75
Lewis G. Fisher.....	Assistant engineer.....	5 00 per day.....	915 00		915 00
Geo. G. Miller.....	Assistant engineer.....	5 00 per day.....	40 00		40 00
G. Edward Gibson.....	Assistant engineer.....	5 00 per day.....	105 00		105 00
Richard E. Phillips.....	Assistant engineer.....	5 00 per day.....	300 00		300 00
John H. Huber.....	Assistant engineer.....	5 00 per day.....	600 00	7 70	607 70
Arthur S. Whitbeck.....	Assistant engineer.....	5 00 per day.....	215 00	12 90	227 90
C. G. Harger, Jr.....	Financial clerk.....	5 00 per day.....	560 00		560 00
A. B. Williams.....	Estimate clerk.....	4 50 per day.....	405 00		405 00
A. B. Williams.....	Estimate clerk.....	4 00 per day.....	92 00		92 00
F. V. Searls.....	Estimate clerk.....	4 00 per day.....	408 00		408 00
Anna M. Lorscheider.....	Estimate clerk.....	1,000 per year.....	27 79		27 79
John D. Groves.....	Estimate clerk.....	75 00 per month.....	262 50		262 50
Harry H. Greene.....	Leveller.....	4 50 per day.....	288 00		288 00
L. G. Fisher.....	Leveller.....	4 50 per day.....	27 00		27 00
Arthur S. Whitbeck.....	Leveller.....	4 50 per day.....	580 50		580 50
E. P. Strowger.....	Leveller.....	4 50 per day.....	814 50	47 85	862 35
John H. Huber.....	Leveller.....	4 50 per day.....	175 50		175 50
Chas. G. Ranney.....	Leveller.....	4 50 per day.....	283 50		283 50
Edward Anderberg.....	Leveller.....	4 50 per day.....	184 50		184 50
Edward K. Triol.....	Leveller.....	4 50 per day.....	472 50	127 85	600 35
Melvin D. Caster.....	Leveller.....	4 50 per day.....	306 00	25 08	331 08
J. B. Barrett.....	Leveller.....	4 50 per day.....	234 00	24 37	258 37
Frank W. Bristow.....	Draftsman.....	5 00 per day.....	1,100 00		1,100 00
Tracy B. Smith.....	Draftsman.....	5 00 per day.....	170 00		170 00
Richard E. Phillips.....	Draftsman.....	5 00 per day.....	130 00		130 00
G. Edward Gibson.....	Draftsman.....	5 00 per day.....	215 00		215 00
H. G. McKelvey.....	Draftsman.....	4 50 per day.....	823 50		823 50
Chas. R. Zorsch.....	Draftsman.....	4 50 per day.....	49 50		49 50
Edward A. Zorsch.....	Draftsman.....	4 50 per day.....	117 00		117 00
Edward H. Bourne.....	Draftsman.....	4 00 per day.....	1,244 00		1,244 00
J. Seward Summers.....	Draftsman.....	4 00 per day.....	1,232 00		1,232 00
R. T. Webster.....	Rodman.....	4 00 per day.....	648 00		648 00
Jos. W. Howe.....	Rodman.....	4 00 per day.....	512 00	21 27	533 27
C. J. Bean.....	Rodman.....	4 00 per day.....	884 00		884 00
Walter G. Dubey.....	Rodman.....	4 00 per day.....	912 00	12 80	924 80
John P. Kelley.....	Rodman.....	4 00 per day.....	1,248 00		1,248 00
Melvin D. Caster.....	Rodman.....	4 00 per day.....	204 00		204 00
John P. Kelley.....	Rodman.....	3 50 per day.....	36 00	15 25	51 25
Geo. G. Sweet.....	Rodman.....	3 50 per day.....	42 00		42 00
Chas. G. Ranney.....	Rodman.....	3 50 per day.....	77 00		77 00
Edward Anderberg.....	Rodman.....	3 50 per day.....	451 50		451 50
Lewis T. Howard.....	Rodman.....	3 50 per day.....	451 50		451 50
Oscar Hasbrouck.....	Rodman.....	3 50 per day.....	451 50		451 50
Guernsey T. Ellis.....	Rodman.....	3 50 per day.....	63 00		63 00
E. P. Strowger.....	Rodman.....	3 50 per day.....	252 00		252 00
B. E. Moses.....	Rodman.....	3 50 per day.....	59 50		59 50
Elias H. Anderson.....	Rodman.....	3 50 per day.....	38 50		38 50
Harry Kehoe.....	Rodman.....	3 50 per day.....	399 00		399 00
Harry N. Haight.....	Rodman.....	3 50 per day.....	273 00		273 00
Harry C. Smith.....	Rodman.....	3 50 per day.....	325 50	37 51	363 01
E. J. Greiner.....	Chainman.....	3 00 per day.....	199 50		199 50
			936 00		936 00

Construction of Barge Canal—Erie Canal—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. B. Chappell.....	Chairman.....	\$3 00 per day	\$624 00		\$624 00
Harry D. Waldo.....	Chairman.....	3 00 per day	225 00		225 00
H. E. Moses.....	Chairman.....	3 00 per day	318 00		318 00
E. A. Bonney.....	Chairman.....	3 00 per day	6 00		6 00
Chas. A. Carruth.....	Chairman.....	3 00 per day	15 00	\$2 14	17 14
T. W. Gerstner.....	Chairman.....	3 00 per day	549 00		549 00
John H. Huber.....	Chairman.....	3 00 per day	153 00		153 00
F. W. Gerstner.....	Chairman.....	2 50 per day	322 50		322 50
John H. Huber.....	Chairman.....	2 50 per day	195 00		195 00
Chas. F. Swain.....	Chairman.....	2 50 per day	97 50		97 50
Warren K. Platner.....	Chairman.....	2 50 per day	2 50	7 22	9 72
Elias H. Anderson.....	Chairman.....	2 50 per day	152 50		152 50
D. S. Hollenbeck.....	Postman.....	3 00 per day	936 00		936 00
Chas. R. Zorsch.....	Laborer.....	2 00 per day	270 00		270 00
Clarence M. Colony.....	Laborer.....	2 00 per day	330 00		330 00
Wm. M. Smith.....	Laborer.....	2 00 per day	50 00	6 00	56 00
Wm. Krugman.....	Laborer.....	2 00 per day	104 00	22 10	126 10
M. Martin.....	Laborer.....	2 00 per day	216 00		216 00
Anton Croll.....	Laborer.....	2 00 per day	16 00		16 00
Peter Fisher.....	Laborer.....	2 00 per day	30 00		30 00
John Flynn.....	Laborer.....	2 00 per day	42 00		42 00
L. R. Barnes.....	Laborer.....	2 00 per day	146 00		146 00
W. S. Cameron.....	Laborer.....	2 00 per day	366 00		366 00
Harvey G. Eckler.....	Laborer.....	2 00 per day	362 00		362 00
T. M. Indertlied.....	Laborer.....	2 00 per day	566 00	189 23	755 23
Herbert Love.....	Laborer.....	2 00 per day	436 00		436 00
Chas. Hietzer.....	Laborer.....	2 00 per day	84 00		84 00
John Dick.....	Laborer.....	2 00 per day	122 00		122 00
L. S. Webster.....	Laborer.....	2 00 per day	336 00		336 00
Wm. H. Ginnity.....	Laborer.....	2 00 per day	318 00		318 00
C. B. Nye.....	Laborer.....	2 00 per day	624 00		624 00
Theophilus Beaupre.....	Laborer.....	2 00 per day	624 00		624 00
Thos. J. Love.....	Laborer.....	2 00 per day	184 00	46 00	230 00
Edwin F. Hurd.....	Laborer.....	2 00 per day	10 00		10 00
I. M. Hegendorfer.....	Laborer.....	2 00 per day	600 00		600 00
Arthur B. Eddy.....	Laborer.....	2 00 per day	624 00		624 00
Edward Wilson.....	Laborer.....	2 00 per day	384 00		384 00
Fred W. Drake.....	Laborer.....	2 00 per day	610 00		610 00
S. A. Patterson.....	Laborer.....	2 00 per day	566 00	163 40	729 40
Michael Smith.....	Laborer.....	2 00 per day	74 00		74 00
Gainham Ball.....	Laborer.....	2 00 per day	188 00		188 00
Antonio Pasmarelli.....	Laborer.....	2 00 per day	186 00		186 00
Christ Kumro.....	Laborer.....	2 00 per day	624 00	196 99	819 99
Fred Schwandager.....	Laborer.....	2 00 per day	396 00		396 00
Chas. Oxcel.....	Laborer.....	2 00 per day	384 00		384 00
Daniel Kumro.....	Laborer.....	2 00 per day	396 00		396 00
Arthur W. Drake.....	Laborer.....	2 00 per day	212 00		212 00
R. W. Phipps.....	Laborer.....	2 00 per day	108 00		108 00
Peter Russell.....	Laborer.....	2 00 per day	20 00		20 00
Wm. O. Bryan.....	Laborer.....	2 00 per day	26 00		26 00
Edward May.....	Laborer.....	2 00 per day	310 00		310 00
W. B. Hill.....	Laborer.....	2 00 per day	38 00		38 00
Walter Tibbi's.....	Laborer.....	2 00 per day	8 00		8 00
Wm. Downing.....	Laborer.....	2 00 per day	30 00		30 00
Michael Compolieto.....	Laborer.....	2 00 per day	20 00		20 00
Jacob Frank.....	Laborer.....	2 00 per day	272 00		272 00
Fred R. Bernish.....	Laborer.....	2 00 per day	256 00		256 00
Frank Fobender.....	Laborer.....	2 00 per day	174 00		174 00
Thos. Carragher.....	Laborer.....	2 00 per day	68 00		68 00
Richard Appleton.....	Laborer.....	2 00 per day	174 00		174 00
E. R. Maynard.....	Laborer.....	2 00 per day	240 00		240 00
Thos. Carvin.....	Laborer.....	2 00 per day	108 00		108 00
Geo. Helmsletter.....	Laborer.....	2 00 per day	14 00		14 00
Jay Dixon.....	Laborer.....	2 00 per day	118 00		118 00
Will Frind.....	Laborer.....	2 00 per day	114 00		114 00
Fred West.....	Laborer.....	2 00 per day	86 00		86 00
C. A. Faucher.....	Laborer.....	2 00 per day	44 00		44 00
Henry Engler.....	Laborer.....	2 00 per day	10 00		10 00
G. Latta Barrus.....	Laborer.....	2 00 per day	96 00		96 00
A. F. Heath.....	Laborer.....	2 00 per day	18 00		18 00
James Farrell.....	Gage reader.....	7 00 per month	36 50		36 50
Jacob Snell, Jr.....	Gage reader.....	6 00 per month	72 00		72 00
John F. Wickham.....	Gage reader.....	5 00 per month	56 94		56 94
Wm. Moran.....	Gage reader.....	5 00 per month	60 00		60 00
Geo. E. Krill.....	Gage reader.....	5 00 per month	60 00		60 00
Wm. J. Swartz.....	Gage reader.....	12 00 per month	7 10		7 10

Construction of Barge Canal—Erie Canal—(Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Wm. J. Swarts.....	Gage reader.....	\$5 00 per month	\$45 00		\$45 00
W. K. Courneen.....	Gage reader.....	5 00 per month	10 00		10 00
George Fischer.....	Gage reader.....	1 00 per week	1 86		1 86
<i>Incidental Expenses.</i>					\$57,750 65
Other expenses (livery).....				\$756 00	
Instruments, tools and appliances.....				494 64	
Office rent, etc.....				1,364 50	
Fuel and light.....				162 89	
Stationery and printing.....				94 84	
Postage.....				158 90	
Telephone and telegraph.....				426 76	
Miscellaneous.....				2,661 68	
					6,119 71
Total.....					\$63,870 86

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. J. Rockwood.....	Division engineer.....	\$3,600 per year		\$344 87	\$344 87
M. W. Wilbur.....	First resident engineer.....	2,700 per year	\$802 50	159 29	961 79
M. W. Wilbur.....	Resident engineer.....	2,400 per year	886 18	115 79	1,001 97
James E. Kelley.....	Resident engineer.....	2,400 per year	800 00	194 06	994 06
E. V. R. Payne.....	Resident engineer.....	2,400 per year	800 00	248 62	1,048 62
Thos. J. Morrison.....	First assistant engineer.....	7 00 per day	448 00		448 00
Chas. M. Edwards.....	First assistant engineer.....	7 00 per day	546 00	308 76	854 76
Chas. M. Edwards.....	Assistant engineer.....	6 00 per day	282 00	50 34	332 34
Thos. J. Morrison.....	Assistant engineer.....	6 00 per day	492 00	5 00	497 00
Isaac O. Cole.....	Assistant engineer.....	6 00 per day	1 350 00	1 249 28	2 599 28
Wm. C. Perkins.....	Assistant engineer.....	6 00 per day	72 00	11 97	83 97
Chas. M. Edwards.....	Assistant engineer.....	5 00 per day	510 00	31 38	541 38
George G. Miller.....	Assistant engineer.....	5 00 per day	870 00	359 18	1 229 18
John S. Clancy.....	Assistant engineer.....	5 00 per day	100 00	2 58	102 58
Arthur S. Whitbeck.....	Assistant engineer.....	5 00 per day	85 00	10 20	95 20
John P. Kelley.....	Assistant engineer.....	5 00 per day	285 00	10 62	295 62
C. G. Harger, Jr.....	Financial clerk.....	5 00 per day	305 00		305 00
A. B. Williams.....	Estimate clerk.....	4 50 per day	190 50		190 50
A. B. Williams.....	Estimate clerk.....	4 00 per day	72 00		72 00
F. V. Searls.....	Estimate clerk.....	4 00 per day	852 00		852 00
Anna M. Lorscheider.....	Stenographer.....	1,000 per year	27 79		27 79
Anna M. Lorscheider.....	Stenographer.....	75 00 per month	75 00		75 00
Geo. G. Miller.....	Leveler.....	5 00 per day	520 00		520 00
Geo. G. Miller.....	Leveler.....	4 50 per day	58 50	35 31	93 81
E. P. Strowger.....	Leveler.....	4 50 per day	589 50	29 03	618 53
John P. Kelley.....	Leveler.....	4 50 per day	117 00	75	117 75
W. T. Huber.....	Leveler.....	4 50 per day	297 00	29 06	326 06
M. S. Smith.....	Leveler.....	5 00 per day	60 00		60 00
E. A. Bonney.....	Inspector.....	4 50 per day	58 50		58 50
Harry S. Waldo.....	Inspector.....	4 50 per day	117 00		117 00
C. H. Fosdick.....	Inspector.....	4 00 per day	100 00		100 00
Tracy B. Smith.....	Draftsman.....	5 00 per day	1,380 00	46 39	1,426 39
Frank W. Bristow.....	Draftsman.....	5 00 per day	1,395 00		1,395 00
H. G. McKelvey.....	Draftsman.....	5 00 per day	510 00		510 00
H. G. McKelvey.....	Draftsman.....	4 50 per day	900 00		900 00
Charles R. Zorsch.....	Draftsman.....	4 50 per day	72 00		72 00
R. T. Webster.....	Rodman.....	4 00 per day	424 00	6 44	430 44
Jos. W. Howe.....	Rodman.....	4 00 per day	384 00	1 36	385 36
E. A. Bonney.....	Rodman.....	4 00 per day	428 00	34 04	462 04
C. J. Bean.....	Rodman.....	4 00 per day	348 00	2 40	350 40
Clarence M. Colony.....	Rodman.....	4 00 per day	164 00		164 00
John P. Kelley.....	Rodman.....	4 00 per day	216 00	3 68	219 68
John P. Kelley.....	Rodman.....	3 50 per day	430 50	5 10	435 60
E. P. Strowger.....	Rodman.....	3 50 per day	339 50	5 70	345 20

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
B. E. Moss.	Rodman.	\$3 50 per day.	\$267 75	\$24 13	\$291 88
Harry J. Simmelink.	Rodman.	3 50 per day.	77 00		77 00
George C. Andrews.	Rodman.	3 50 per day.	192 50		192 50
H. W. Lockwood.	Rodman.	3 50 per day.	87 50		87 50
F. A. Bonney.	Chainman.	3 00 per day.	459 00		459 00
Harry D. Waldo.	Chainman.	3 00 per day.	606 00		606 00
A. B. Chappell.	Chainman.	3 00 per day.	252 00		252 00
Chas. A. Carruth.	Chainman.	3 00 per day.	201 00		201 00
C. H. Foodick.	Chainman.	3 00 per day.	147 00		147 00
B. E. Moss.	Chainman.	3 00 per day.	85 00		85 00
Chas. F. Swain.	Chainman.	3 00 per day.	171 00		171 00
Chas. F. Swain.	Chainman.	2 50 per day.	130 00		130 00
B. E. Moss.	Chainman.	2 50 per day.	172 50		172 50
Chas. R. Zorsch.	Laborer.	2 00 per day.	274 00		274 00
Thos. J. Love.	Laborer.	2 00 per day.	388 00	97 00	485 00
Gates Smith.	Laborer.	2 00 per day.	54 00		54 00
Wm. G. Cameron.	Laborer.	2 00 per day.	198 00		198 00
H. G. Eckler.	Laborer.	2 00 per day.	202 00		202 00
Clarence M. Colony.	Laborer.	2 00 per day.	212 00		212 00
I. S. Webster.	Laborer.	2 00 per day.	230 00		290 00
Wm. H. Ginnity.	Laborer.	2 00 per day.	282 00		282 00
Edwin M. Secrist.	Laborer.	2 00 per day.	176 00		176 00
James Boucher.	Laborer.	2 00 per day.	142 00		142 00
Byron T. Biggood.	Laborer.	2 00 per day.	152 00		152 00
Carl T. Smith.	Laborer.	2 00 per day.	136 00		136 00
W. W. Baneroff.	Laborer.	2 00 per day.	130 00		130 00
Herbert C. Snelgrove.	Laborer.	2 00 per day.	132 00		132 00
Raymond F. Nicholls.	Laborer.	2 00 per day.	156 00		156 00
Grover C. Ingersoll.	Laborer.	2 00 per day.	142 00		142 00
Arthur L. Powell.	Laborer.	2 00 per day.	148 00		148 00
H. J. Spellman.	Laborer.	2 00 per day.	174 00		174 00
Adelbert G. Clark.	Laborer.	2 00 per day.	20 00		20 00
Wm. H. Lines.	Laborer.	2 00 per day.	115 00		115 00
Arthur E. Williams.	Laborer.	2 00 per day.	166 00		166 00
Richard P. Hunt.	Laborer.	2 00 per day.	88 00		88 00
Raymond P. Aridener.	Laborer.	2 00 per day.	110 00		110 00
A. E. Barnes.	Laborer.	2 00 per day.	84 00	49 11	133 11
John L. Bacon Jr.	Laborer.	2 00 per day.	122 00		122 00
E. W. Conklin.	Laborer.	2 00 per day.	118 00		118 00
A. Galbraith.	Laborer.	2 00 per day.	110 00		110 00
Geo. C. Andrews.	Laborer.	2 00 per day.	44 00		44 00
Harry F. Tennant.	Laborer.	2 00 per day.	48 00		48 00
Dean R. Hill.	Laborer.	2 00 per day.	118 00		118 00
Geo. H. Mensies.	Laborer.	2 00 per day.	128 00		128 00
Howard T. Jones.	Laborer.	2 00 per day.	90 00		90 00
Howard B. Graves.	Laborer.	2 00 per day.	108 00		108 00
S. A. Patterson.	Laborer.	2 00 per day.	44 00	11 58	55 58
T. M. Inderlied.	Laborer.	2 00 per day.	48 00	12 00	60 00
Frisla L. Jones.	Laborer.	2 00 per day.	110 00		110 00
Lewis Henry.	Laborer.	2 00 per day.	56 00		56 00
Henry Engler.	Laborer.	2 00 per day.	40 00		40 00
C. A. Fancher.	Laborer.	2 00 per day.	28 00		28 00
G. W. Rinck.	Laborer.	2 00 per day.	52 00		52 00
Geo. W. Rogers.	Laborer.	2 00 per day.	46 00		46 00
Carl Oelkers.	Laborer.	2 00 per day.	22 00		22 00
Fred M. Douglass.	Laborer.	2 00 per day.	46 00		46 00
Edward L. Wick.	Laborer.	2 00 per day.	36 00		36 00
Harry B. Harrison.	Laborer.	2 00 per day.	36 00		36 00
Bryant C. Hudson.	Laborer.	2 00 per day.	36 00		36 00
Edward E. Fones.	Laborer.	2 00 per day.	14 00		14 00
Chas. Lake.	Laborer.	2 00 per day.	4 00		4 00
<i>Incidental Expenses.</i>					\$30,837 74
Stationery and printing.				\$12 38	
Rent.				96 24	
Livery.				1,631 50	
Postage.				29 50	
Telegraph and telephone.				127 52	
Miscellaneous.				2,187 74	
Total.					4,064 88
					\$34,922 62

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

Name of road.	Road No.	Town.	County.	Total.
Whites Corners.....	2	West Seneca.....	Erie.....	\$15 58
East Avenue.....	5	Hamburg.....	Monroe.....	4 00
Little Ridge, section 1.....	6	Brighton.....	Monroe.....	10 35
Southport, section 1.....	13	Pittsford.....	Chemung.....	8 30
Hudson Avenue, section 1.....	15	Greece.....	Monroe.....	1 58
River road, section 1.....	23	Southport.....	Erie.....	5 41
Orchard Park, section 1.....	27	Irondequoit.....	Erie.....	6 70
Southport, section 2.....	28	Tonawanda.....	Chemung.....	16 10
Southport, section 3.....	29	E. Hamburg.....	Chemung.....	12 05
South Broadway.....	30	Southport.....	Cnemung.....	4 00
Fairport, section 1.....	60	Southport.....	Monroe.....	7 15
Pittsford.....	61	Perinton.....	Monroe.....	3 40
West Henrietta.....	62	Pittsford.....	Monroe.....	664 10
Scottsville, section 1.....	63	Henrietta.....	Monroe.....	562 29
Orchard Park, section 2.....	66	Brighton.....	Erie.....	8 31
Orchard Park, section 3.....	67	Chili.....	Erie.....	3 25
Orchard Park, section 5.....	68	E. Hamburg.....	Erie.....	3 25
Main Street, section 1.....	69	W. Seneca.....	Erie.....	16 99
Clifton, section 1.....	78	W. Seneca.....	Monroe.....	201 46
Scottsville, section 2.....	79	Amherst.....	Monroe.....	865 70
Hamlin, section 1.....	80	Chili.....	Monroe.....	21 67
Hamlin, section 2.....	81	Wheatland.....	Monroe.....	5 40
Buffalo, section 1.....	82	Clarkson.....	Monroe.....	3 00
Buffalo, section 2.....	83	Hamlin.....	Monroe.....	4 68
Big Tree.....	86	Gates.....	Erie.....	6 92
Main street, section 2.....	87	Aurora.....	Erie.....	5 45
Transit, section 1.....	88	Wales.....	Erie.....	6 45
Transit, section 2.....	89	Amherst.....	Erie.....	5 00
Monroe Avenue.....	94	Clarence.....	Monroe.....	7 85
Webster, section 1.....	98	Amherst.....	Monroe.....	14 15
Webster, section 2.....	99	Clarence.....	Monroe.....	3 70
Webster, section 3.....	100	Brighton.....	Monroe.....	12 95
Webster, section 4.....	101	Pittsford.....	Monroe.....	4 35
Aurora-Buffalo, section 1.....	128	Irondequoit.....	Erie.....	8 70
River, sections 2 and 3.....	129	Penfield.....	Erie.....	5 39
Main street, section 3.....	130	Webster.....	Erie.....	10 27
Main street, section 4.....	131	Webster.....	Erie.....	10 27
Geneva-Canandaigua, section 2.....	146	Webster.....	Ontario.....	8 20
Little Ridge, section 2.....	165	W. Seneca.....	Monroe.....	5 90
Penfield, section 1.....	166	Tonawanda.....	Monroe.....	20 50
Penfield, section 2.....	167	Clarence.....	Monroe.....	14 45
Dugway, section 1.....	168	Newstead.....	Monroe.....	12 55
Dugway, section 2.....	169	Seneca.....	Monroe.....	3 35
Dugway, section 3.....	170	Parma.....	Monroe.....	11 10
Lake, section 1.....	171	Penfield.....	Monroe.....	4 36
Portland Avenue, section 1.....	172	Brighton.....	Monroe.....	1 82
Bristol.....	187	Penfield.....	Ontario.....	957 21
Bristol Valley, section 1.....	188	Sweden.....	Ontario.....	9 84
East Side Lake, section 2.....	189	Irondequoit.....	Ontario.....	6 60
East Side Lake, section 1.....	190	Canandaigua.....	Ontario.....	268 20
Honeoye-Hemlock.....	191	E. Bloomfield.....	Ontario.....	11 40
Gorham-Stanley.....	203	Bristol.....	Ontario.....	6 45
Naples-Atlanta, section 1.....	204	Canandaigua.....	Ontario.....	283 53
Naples-Woodville.....	205	Gorham.....	Ontario.....	388 13
Total.....		Naples.....		\$4,570 26

Surveys for Court of Claims.

Chapter 700, Laws of 1905.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. J. Rockwood.....	Division engineer.....	\$3,600 per year.....		\$17 17	\$17 17
M. W. Wilbur.....	First resident engineer.....	2,700 per year.....	\$45 00	12 18	57 18
M. W. Wilbur.....	Resident engineer.....	2,400 per year.....	132 42	78 44	210 86
D. D. Waldo.....	Assistant engineer.....	6 00 per day.....	345 00	110 27	455 27
Chas. A. Ingersoll.....	Assistant engineer.....	6 00 per day.....	48 00	1 00	49 00
Chas. A. Ingersoll.....	Assistant engineer.....	5 00 per day.....	30 00	1 00	31 00
Chas. M. Edwards.....	Assistant engineer.....	6 00 per day.....	180 00	66 18	246 18
Chas. M. Edwards.....	Assistant engineer.....	5 00 per day.....	75 00	25 18	100 18
E. V. R. Payne.....	Assistant engineer.....	6 00 per day.....	6 00	7 08	13 08
Philip H. Dater.....	Assistant engineer.....	6 00 per day.....	18 00	16 66	34 66
Geo. G. Miller.....	Leveler.....	4 50 per day.....	49 50	5 48	54 98
Arthur S. Whitbeck.....	Leveler.....	4 50 per day.....	4 50		4 50
E. A. Bonney.....	Inspector.....	4 50 per day.....	63 00	11 60	74 60
Tracy B. Smith.....	Draftsman.....	5 00 per day.....	40 00	1 64	41 64
Edward H. Bourne.....	Draftsman.....	4 00 per day.....	40 00	1 50	41 50
H. G. McKelvey.....	Draftsman.....	5 00 per day.....	12 50		12 50
E. P. Strouger.....	Rodman.....	3 50 per day.....	31 50		31 50
B. E. Moses.....	Rodman.....	3 50 per day.....	66 50		66 50
Harry J. Simmslink.....	Rodman.....	3 50 per day.....	28 00		28 00
E. A. Bonney.....	Rodman.....	4 00 per day.....	44 00	9 12	53 12
E. A. Bonney.....	Chainman.....	3 00 per day.....	33 00	7 25	40 25
Harry D. Waldo.....	Chainman.....	3 00 per day.....	54 00	82	54 82
A. B. Chappell.....	Chainman.....	3 00 per day.....	54 00		54 00
B. E. Moses.....	Chainman.....	2 50 per day.....	35 00	82	35 82
S. A. Patterson.....	Laborer.....	2 00 per day.....	30 00	3 50	23 50
W. S. Cameron.....	Laborer.....	2 00 per day.....	34 00		34 00
H. G. Eckler.....	Laborer.....	2 00 per day.....	34 00		34 00
Thos. J. Love.....	Laborer.....	2 00 per day.....	4 00	1 00	5 00
T. M. Indwiled.....	Laborer.....	2 00 per day.....	14 00	3 50	17 50
<i>Incidental Expenses.</i>					\$1,922 81
Livery.....				\$261 00	
Telephone and telegraph.....				9 96	
Miscellaneous.....				29 90	
					300 86
Total.....					\$2,223 17

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1. Erie canal, chapter 699, Laws of 1905..... \$9,000 00

Construction of Barge Canal.

2. Construction of Barge canal, Erie canal, chapter 147, Laws of 1903..... 63,870 36

Improvement of Public Highways.

3. Improvement of public highways chapter 115, Laws of 1898; chapter 468, Laws of 1906..... 34,922 62
4. Maintenance and repairs of improved public highways, chapter 115, Laws of 1898; chapter 463, Laws of 1906; chapter 886, Laws of 1906..... 4,570 26

Special Surveys.

5. Surveys for Court of Claims, chapter 700, Laws of 1905..... 2 223 17
- \$114,586 41

TABLE OF CONTRACTS COMPLETED ON THE WESTERN DIVISION DURING THE FISCAL YEAR ENDING SEP-

TEMBER 30, 1906.

Improvement of Public Highways.

Chapter 115, Laws of 1898.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
Henry P. Burgard.....	June 7, 1904	Penfield (section 2) road, No. 167, Monroe county.....	\$30,500 00	\$30,586 45
Frederick A. Brotsch.....	Oct. 15, 1904	Portland avenue (section 1) road, No. 172, Monroe county.....	16,580 00	6,585 97
Mott and Kemper.....	June 17, 1904	Eastside lake (section 1) road, No. 190, Ontario county.....	16,900 00	16,889 24
Mosier and Summers.....	June 17, 1904	Honeoye-Hemlock road, No. 191, Ontario county.....	34,900 00	33,377 42
Mosier and Summers.....	July 17, 1906	Honeoye-Hemlock road, No. 191-A, Ontario county.....	1,062 82	1,062 82
Henry P. Burgard.....	July 14, 1904	Geneva-Canandaigua (section 2) road, No. 207, Ontario county.....	45,000 00	43,387 02

TABLE OF CONTRACTS PENDING ON THE WESTERN DIVISION, SEPTEMBER 30, 1906.
Construction of Barge Canal.
 Chapter 147, Laws of 1903.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1906
F. A. Macell & Co.	May 8, 1905	Contract No. 6.	\$1,588,912 00	\$1,005,982 50	\$231,327 00
Groton Bridge Co.	Aug. 10, 1906	Contract No. 7, bridges on contract No. 6. ....	.....	27,337 80	.....

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1906.
Pittsford Construction Co.	Aug. 14, 1906	Penfield (section 1) road, No. 166-A, Monroe county. ....	.....	\$148 25	.....
Pittsford Construction Co.	Aug. 14, 1906	Penfield (section 2) road, No. 167-A, Monroe county. ....	.....	972 55	\$454 28
Pittsford Construction Co.	Aug. 14, 1906	Dugway (section 2) road, No. 169-A, Monroe county. ....	.....	572 50	.....
John Johnson.	Sept. 19, 1906	Bristol Valley (section 1) road, No. 188-A, Ontario county. ....	.....	153 00	.....
John Johnson.	Sept. 19, 1906	East Side Lake (section 1) road, No. 190-A, Ontario county. ....	.....	500 00	.....
John Johnson.	Sept. 19, 1906	Gorham-Stanley road, No. 203-A, Ontario county. ....	.....	804 50	.....
John Johnson.	July 10, 1906	Reeds Corners road, No. 206, Ontario county.	\$21,000 00	19,700 00	6,395 40
Mosier & Summers, Inc.	July 5, 1906	Griswold street road, No. 251, Niagara county.	18,400 00	17,500 00	14,546 83
Frederick A. Brotsch.	July 11, 1906	Clifton (section 2) road, No. 252, Monroe county.	22,200 00	18,000 00	13,921 88
Frederick A. Brotsch.	July 11, 1906	Lyell road, No. 253, Monroe county.	22,000 00	18,000 00	.....
Frederick A. Brotsch.	July 11, 1906	Chili (section 1) road, No. 254, Monroe county.	27,700 00	19,400 00	.....
Greece Construction Co.	July 13, 1906	Little Ridge (section 3) road, No. 256, Monroe county.	26,000 00	16,070 00	.....
Greece Construction Co.	July 13, 1906	Little Ridge (section 4) road, No. 257, Monroe county.	28,800 00	23,600 00	.....
Gantz-Wilson Const'n Co.	July 18, 1906	Aurora-Buffalo (section 2) road, No. 263, Erie county.	28,100 00	23,000 00	.....
Erie County Board of Supervisors.	July 10, 1906	Aurora-Buffalo (section 3) road, No. 264, Erie county.	42,400 00	39,850 00	.....
Frederick A. Brotsch.	July 11, 1906	Hilton road, No. 269, Monroe county.	6,900 00	6,500 00	.....
John Johnson.	July 10, 1906	Orchard park (section 5) road, No. 272, Erie county.	28,000 00	26,000 00	.....
Greece Construction Co.	July 13, 1906	Barnards Crossing (sections 1 and 2) road, No. 276, Monroe county.	13,700 00	12,000 00	9,029 88
Henry C. Schroeder.	July 10, 1906	Geneva-Canandaigua (section 3) road, No. 333, Ontario county.	39,400 00	34,900 00	8,480 70
			9,400 00	8,242 44	5,963 11

Henry C. Schroeder.....	July 10, 1906	Lyons-Geneva road, No. 334, Ontario county.....	15,716 00	12,465 50	336 57
Mosler & Summers, Inc.....	July 5, 1906	Victor-Mendon (section 1) road, No. 335, Ontario county.....	42,800 00	36,400 00	5,692 50
Bowler & Ravilla.....	July 7, 1906	Erin-Horsesheds road, No. 356, Chemung county.....	102,000 00	93,012 00	16,850 16
Costello & Nagle.....	Sept. 13, 1906	Grand Central avenue road, No. 357, Chemung county.....	16,400 00	14,260 00	1,239 97
Gantz-Wilson Construction Co.....	July 13, 1906	Clinton street (section 1) road, No. 371, Erie county.....	55,900 00	45,925 00	.....
Gantz-Wilson Construction Co.....	July 18, 1906	Clinton street (section 2) road, No. 372, Erie county.....	61,500 00	52,995 00	.....
William E. Baldwin & Co.....	July 9, 1906	Goodrich road, No. 373, Erie county.....	84,400 00	69,197 00	.....
Thomas Hucknell.....	Aug. 31, 1906	Five Corners-Kuckville (section 1) road, No. 380, Orleans county.....	21,300 00	17,531 00	.....
Thomas Hucknell.....	Aug. 31, 1906	Five Corners-Kuckville (section 2) road, No. 387, Orleans county.....	41,500 00	36,935 00	.....
Chambers & Grady.....	July 9, 1906	Kendall Corners road, No. 388, Orleans county.....	24,900 00	22,700 00	.....
Good Roads Construction Co.....	Sept. 8, 1906	Suspension Bridge-Lewiston road, No. 475, Niagara county.....	25,500 00	23,500 00	1,269 00
McCarthy & Simerson.....	July 11, 1906	Dansville-Mt. Morris (section 3) road, No. 482, Livingston county.....	25,000 00	22,850 00	8,865 63
Chambers & Grady.....	July 9, 1906	Canandaigua-Victor road, No. 484, Ontario county.....	51,000 00	44,135 00	13,626 81
William E. Baldwin & Co.....	July 9, 1906	Transtel (section 3) road, No. 507, Niagara county.....	48,000 00	38,699 00	8,952 98
Fred W. Knickenburg.....	June 20, 1906	Clarence-Hunts Corners road, No. 522, Erie county.....	41,000 00	31,800 00	13,173 30
William E. Baldwin & Co.....	July 9, 1906	Lamburg-North Collins road, No. 523, Erie county.....	114,900 00	94,000 00	.....
Fred W. Knickenburg.....	June 20, 1906	East Penbroke-Batavia road, No. 586, Genesee county.....	49,000 00	37,960 00	.....

Maintenance and Repair of Improved Public Highways.

Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Payments to September 30, 1906.
Pittsford Construction Co.....	Aug. 14, 1906	East avenue road, No. 5, Monroe county.....	\$11,817 00	\$906 53
Pittsford Construction Co.....	Aug. 14, 1906	Fairport road, No. 60, Monroe county.....	1,440 00	1,034 10
Pittsford Construction Co.....	Aug. 14, 1906	Pittsford road, No. 61, Monroe county.....	285 00	123 12
Pittsford Construction Co.....	Aug. 14, 1906	Monroe avenue road, No. 94, Monroe county.....	2,249 00	1,852 74
Grand Ave. Horse Co.....	Aug. 9, 1906	Dugway (section 1) road, No. 168, Monroe county.....	9,569 00	4,479 21
Grand Ave. Horse Co.....	Aug. 9, 1906	Dugway (section 3) road, No. 170, Monroe county.....	466 00	.....

Report of Special Examiner of Highways.

Report of Cement Tests.

Report of the Land Bureau.

Report of the Bureau of Bridges.

Report on Experimental Oiling of State Highways.

Report of Special Examiner of Highways.

ALBANY, N. Y., October 1, 1906.

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor*:

Sir.— During the year 1905 thirty-one boards of supervisors, while in special or annual session, were visited by me, but during the year 1906, after the appointment of supervisors of highways, work of this character has been confined more particularly to the towns which have adopted the money system. However, 19 boards of supervisors elected to hold public meetings, at which general discussions were held by me relative to the improvement, repair and maintenance of public highways.

In all these counties and towns the highway commissioners, members of town boards and interested citizens were invited to attend the meetings, and the fact that the highway commissioners and members of the town boards were present made them most interesting. Many questions were asked and answered and splendid results have followed in the money-system towns of the state. I would recommend that supervisors of the towns which have adopted the money system be requested to call meetings at a date to be arranged by this Department. One meeting held at ten o'clock in the morning should be attended by the members of town boards, highway commissioners, assessors and collectors, at which time an inspection of the highway, bridge and miscellaneous accounts should be made and general instructions given regarding the proper keeping of the uniform system of town accounts and the duties of assessors and collectors as provided by law. At the afternoon session all citizens of the town interested in road improvement, as well as the officials, should be requested to be present. At this meeting the laws may be defined and the directions for the guidance of highway commissioners explained and questions asked and answers given, thus furnishing information to the end that the best practical results may follow.

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
B. E. Moers.	Rodman	\$3 50 per day	\$287 75	\$24 13	\$291 88
Harry J. Simmelink	Rodman	3 50 per day	77 00		77 00
George C. Andrews	Rodman	3 50 per day	192 50		192 50
H. W. Lockwood	Rodman	3 50 per day	87 50		87 50
E. A. Bonney	Chainman	3 00 per day	459 00		459 00
Harry D. Waldo	Chainman	3 00 per day	606 00		606 00
A. B. Chappell	Chainman	3 00 per day	252 00		252 00
Chas. A. Carruth	Chainman	3 00 per day	201 00		201 00
C. H. Fiedick	Chainman	3 00 per day	147 00		147 00
B. E. Moers	Chainman	3 00 per day	85 00		85 00
Chas. F. Swain	Chainman	3 00 per day	171 00		171 00
Chas. F. Swain	Chainman	2 50 per day	130 00		130 00
B. E. Moers	Chainman	2 50 per day	172 50		172 50
Chas. R. Zorach	Laborer	2 00 per day	274 00		274 00
Thos. J. Levy	Laborer	2 00 per day	388 00	97 00	485 00
Gates Smith	Laborer	2 00 per day	54 00		54 00
Wm. G. Cameron	Laborer	2 00 per day	198 00		198 00
H. G. Eckler	Laborer	2 00 per day	202 00		202 00
Clarence M. Colony	Laborer	2 00 per day	212 00		212 00
L. S. Webster	Laborer	2 00 per day	230 00		230 00
Wm. H. Ginnity	Laborer	2 00 per day	282 00		282 00
Edwin M. Secrist	Laborer	2 00 per day	176 00		176 00
James Boucher	Laborer	2 00 per day	142 00		142 00
Byron T. Biggood	Laborer	2 00 per day	152 00		152 00
Carl T. Smith	Laborer	2 00 per day	136 00		136 00
W. W. Baneroff	Laborer	2 00 per day	130 00		130 00
Herbert C. Snelgrove	Laborer	2 00 per day	132 00		132 00
Raymond F. Nicholls	Laborer	2 00 per day	156 00		156 00
Grover C. Ingersoll	Laborer	2 00 per day	142 00		142 00
Arthur L. Powell	Laborer	2 00 per day	148 00		148 00
H. J. Spellman	Laborer	2 00 per day	174 00		174 00
Adelbert G. Clark	Laborer	2 00 per day	20 00		20 00
Wm. H. Lines	Laborer	2 00 per day	115 00		115 00
Arthur E. Williams	Laborer	2 00 per day	166 00		166 00
Richard P. Hunt	Laborer	2 00 per day	88 00		88 00
Raymond P. Aridener	Laborer	2 00 per day	110 00		110 00
A. E. Barnes	Laborer	2 00 per day	84 00	49 17	133 17
John L. Bacon Jr.	Laborer	2 00 per day	122 00		122 00
E. W. Conklin	Laborer	2 00 per day	118 00		118 00
A. Galbraith	Laborer	2 00 per day	110 00		110 00
Geo. C. Andrews	Laborer	2 00 per day	44 00		44 00
Harry F. Tennant	Laborer	2 00 per day	48 00		48 00
Dean R. Hill	Laborer	2 00 per day	118 00		118 00
Geo. H. Menzies	Laborer	2 00 per day	128 00		128 00
Howard T. Jones	Laborer	2 00 per day	90 00		90 00
Howard B. Graves	Laborer	2 00 per day	108 00		108 00
S. A. Patterson	Laborer	2 00 per day	44 00	11 58	55 58
T. M. Inderlied	Laborer	2 00 per day	48 00	12 00	60 00
Frida L. Jones	Laborer	2 00 per day	110 00		110 00
Lewis Henry	Laborer	2 00 per day	56 00		56 00
Henry Engler	Laborer	2 00 per day	40 00		40 00
C. A. Fancher	Laborer	2 00 per day	28 00		28 00
G. W. Rinck	Laborer	2 00 per day	52 00		52 00
Geo. W. Rogers	Laborer	2 00 per day	46 00		46 00
Carl Oelkers	Laborer	2 00 per day	22 00		22 00
Fred M. Douglass	Laborer	2 00 per day	46 00		46 00
Edward L. Wick	Laborer	2 00 per day	36 00		36 00
Harry B. Harrison	Laborer	2 00 per day	36 00		36 00
Bryant C. Hudson	Laborer	2 00 per day	36 00		36 00
Edward E. Fones	Laborer	2 00 per day	14 00		14 00
Chas. Lake	Laborer	2 00 per day	4 00		4 00
<i>Incidental Expenses.</i>					\$30,837 74
Stationery and printing				\$12 38	
Rent				96 24	
Livery				1,631 50	
Postage				29 50	
Telegraph and telephone				127 52	
Miscellaneous				2,187 74	
Total					4,064 88
Total					\$34,922 62

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

Name of road.	Road No.	Town.	County.	Total.
Whites Corners.....	2	{ West Seneca ... }	Erie.....	\$15 58
East Avenue.....	5	{ Hamburg	Monroe.....	4 00
Little Ridge, section 1.....	6	{ Brighton	Monroe.....	10 35
Southport, section 1.....	13	{ Pittsford	Chemung.....	8 30
Hudson Avenue, section 1.....	15	Greece.....	Monroe.....	1 58
River road, section 1.....	23	Southport.....	Erie.....	5 41
Orchard Park, section 1.....	27	Irondequoit.....	Erie.....	6 70
Southport, section 2.....	28	Tonawanda.....	Chemung.....	16 10
Southport, section 3.....	29	E. Hamburg.....	Chemung.....	12 05
South Broadway.....	30	Southport.....	Chemung.....	4 00
Fairport, section 1.....	60	{ Perinton	Monroe.....	7 15
Pittsford.....	61	{ Pittsford	Monroe.....	3 40
West Henrietta.....	62	{ Henrietta	Monroe.....	664 10
Scottsville, section 1.....	63	{ Brighton	Monroe.....	562 29
Orchard Park, section 2.....	66	Chili.....	Erie.....	8 31
Orchard Park, section 3.....	67	E. Hamburg.....	Erie.....	3 25
Orchard Park, section 5.....	68	W. Seneca.....	Erie.....	3 25
Main Street, section 1.....	69	W. Seneca.....	Erie.....	16 99
Clifton, section 1.....	78	Amherst.....	Monroe.....	201 46
Scottsville, section 2.....	79	Chili.....	Monroe.....	865 70
Hamlin, section 1.....	80	{ Wheatland..... }	Monroe.....	21 67
Hamlin, section 2.....	81	Clarkson.....	Monroe.....	5 40
Buffalo, section 1.....	82	Hamlin.....	Monroe.....	3 00
Buffalo, section 2.....	83	Gates.....	Monroe.....	4 68
Big Tree.....	86	{ Aurora..... }	Erie.....	6 92
Main street, section 2.....	87	{ Wales..... }	Erie.....	5 45
Transit, section 1.....	88	Amherst.....	Erie.....	6 45
Transit, section 2.....	89	{ Clarence..... }	Erie.....	5 00
Monroe Avenue.....	94	{ Amherst..... }	Monroe.....	7 85
Webster, section 1.....	98	{ Clarence..... }	Monroe.....	14 15
Webster, section 2.....	99	{ Brighton	Monroe.....	3 70
Webster, section 3.....	100	{ Pittsford	Monroe.....	12 95
Webster, section 4.....	101	Irondequoit.....	Monroe.....	4 35
Aurora-Buffalo, section 1.....	128	Penfield.....	Erie.....	8 70
River, sections 2 and 3.....	129	Webster.....	Erie.....	5 39
Main street, section 3.....	130	Webster.....	Erie.....	10 27
Main street, section 4.....	131	W. Seneca.....	Erie.....	10 27
Geneva-Canandaigua, section 2.....	146	{ Clarence..... }	Ontario.....	8 20
Little Ridge, section 2.....	165	{ Newstead..... }	Monroe.....	5 90
Penfield, section 1.....	166	Seneca.....	Monroe.....	20 50
Penfield, section 2.....	167	Parma.....	Monroe.....	14 45
Dugway, section 1.....	168	Penfield.....	Monroe.....	12 55
Dugway, section 2.....	169	{ Brighton	Monroe.....	3 35
Dugway, section 3.....	170	{ Penfield	Monroe.....	11 10
Lake, section 1.....	171	Penfield.....	Monroe.....	4 36
Portland Avenue, section 1.....	172	Sweden.....	Monroe.....	1 82
Bristol.....	187	Irondequoit.....	Ontario.....	957 21
Bristol Valley, section 1.....	188	Canandaigua.....	Ontario.....	9 84
East Side Lake, section 2.....	189	{ E. Bloomfield .. }	Ontario.....	6 60
East Side Lake, section 1.....	190	{ Bristol	Ontario.....	268 20
Honeoye-Hemlock.....	191	Canandaigua.....	Ontario.....	11 40
Gorham-Stanley.....	203	Gorham.....	Ontario.....	6 45
Naples-Atlanta, section 1.....	204	Richmond.....	Ontario.....	283 53
Naples-Woodville.....	205	Gorham.....	Ontario.....	388 13
Total.....		Naples.....		\$4,570 26
		Naples.....		

9. To investigate complaints.

While it has been impossible to inspect all of the towns which have adopted the money system, yet nearly 400 reports have been received, and these reports show that the highway commissioners and town officials are thoroughly interested in this question and that, where trouble exists, it is caused by lack of experience and also by a lack of sufficient funds to properly carry on the work to the best possible advantage. The correspondence relative to the work has been extremely large, owing to the interest taken by various town officials and a desire on their part to obtain rulings from this Department, as well as opinions of the Attorney-General of the State.

I believe that as a rule the highway commissioners are putting forth their best efforts and I know of no money-system town to-day where there is a desire on the part of the electors to return to the old system of working the public highways.

Respectfully,

FRANK D. LYON,

Special Examiner of Highways.

Report of Cement Tests.

CEMENT TESTING LABORATORY — STATE HALL.

ALBANY, N. Y., October 1, 1906.

Hon. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor*:

Sir.— I have the honor to submit the following report of the work of the cement testing laboratory of your Department for the fiscal year ending September 30, 1906.

The work has been principally routine work, although many special tests have been made of cement with natural sands.

During the past year there have been submitted to this laboratory for tests 474 lots of cement samples, consisting of a total of 5,691 samples. These have been given a total of 11,392 tests for tensile strength. The briquettes were made up in the proper proportions of cement and standard crushed quartz sand, according as the cements were Portland or natural cements. The number of lots tested shows an increase of 51 per cent from the number tested during the previous year, while the number of samples shows an increase of 44 per cent over the same period.

The work done includes a large number of tests made for the State Architect and for other work. For the State Architect 160 lots, consisting of a total of 1,990 samples, have been given 3,984 tests for tensile strength.

Each lot of samples submitted were, in addition to the tests for tensile strength, given tests for fineness of grinding, for initial and hard set, and for soundness by means of the hot-water test, the normal-water test and normal-air test.

Of the total number of samples tested, 64.6 per cent were from the Department of the State Engineer and Surveyor, 35.0 per cent were from the State Architect and 0.4 per cent were from cities and towns. Early in the year it became necessary to withdraw an offer made some time ago to test free of charge samples of cement which might be sent to this laboratory by towns and villages. This was necessary because of the increase in the regular work.

During the year 72 series of special tests were made. For these 1,367 briquettes were made and included 320 briquettes which were tested to obtain the results of cement with various natural sands. The other tests include various short and long period tests.

The number of failures to meet the requirements of the Department is large and shows the necessity of complete tests of all the cement proposed for use. The results show the following failures:

Portland cements.—32 lots, consisting of 215 separate samples, failed to meet the new requirements of 92 per cent, through a standard sieve of 10,000 meshes per square inch, while 14 samples failed also to pass the requirements for a sieve of 2,500 meshes per square inch. This seems to indicate a continued tendency on the part of manufacturers to refrain from efforts to secure especially fine grinding, since formerly practically all the lots passed the 92 per cent mark. A comparison of the average fineness of the various brands also shows a tendency toward coarser cement.

One lot, consisting of 6 samples, set too quickly in the test for initial set; while 5 lots, consisting of 37 samples, acquired both initial and hard set within the requirements for initial set.

Of the tests for tensile strength, 4 lots, consisting of 28 samples, failed to meet the requirements of 150 pounds per square inch in the 7-day test, but all showed good strength-gaining qualities and passed the 28-day requirements; and 5 lots, consisting of 37 samples, failed in both the 7-day and 28-day tests.

Three lots of cement, consisting of 41 samples, failed in the accelerated tests for soundness.

Natural cements.—One lot set too quickly, and 2 lots, consisting of 25 samples, failed in strength both in 7 and 28-day tests.

Ninety-six per cent of the cement tested was Portland cement and 4 per cent was natural cement. All of the natural cement was used by the Department of the State Architect.

The brands represented by the samples received are about the same as heretofore, although one new brand from Pennsylvania was received. The brands tested were: 22 American Portland, 1 German Portland and 5 American natural. Of the American Portland brands, 9 were manufactured in New York, 10 in Pennsylvania and 3 in New Jersey. Three brands of the natural

cement were made in New York. One new brand of Puzzolan cement was received.

Of the samples of Portland cement tested, 39.0 per cent was made in New York.

A brief description of the method used in making the tests in this laboratory will probably make the results of the tests much better understood as well as more easily comparable with the results obtained in other testing laboratories. The method is practically the same as that recommended by the American Society of Civil Engineers. It is as follows:

Sampling.—After the cement proposed to be used upon any contract work of the State has been delivered and well stored, the engineer in charge, or his representative, takes one sample from every tenth barrel of cement or from the equivalent of the tenth barrel when packed in sacks. Each sample is placed in a double envelope-bag upon which is printed such matter as when filled in by the person taking the sample will give the sample number, brand of cement, date of sampling and work upon which the cement is to be used. About twenty ounces of cement is taken for each sample. The samples are packed firmly and dry in wooden boxes and are then sent by express to this laboratory. Upon receipt here a portion of every sample is taken and these portions are thoroughly mixed into a large general sample. From this mixed sample is taken the cement used in making the tests of fineness, setting qualities, soundness, specific gravity and analysis.

Fineness.—The tests for fineness consist of drying the sample and then weighing on a scale capable of weighing to one ten-thousandth part of a pound a certain amount of the cement. This is carefully sieved through standard sieves of 2,500 and 10,000 meshes to the square inch. The sieving is done by means of a mechanical sifter operated by electricity, but all tests are completed by hand sifting. The residue is weighed and the percentages thus obtained. Ninety-nine per cent of the cement must pass the 2,500-mesh sieve and 92 per cent must pass the 10,000-mesh sieve.

Setting qualities.—From the mixed sample enough is also taken to make a ball of paste for the mould of the Vicat apparatus and for three neat pats. This is mixed up into a paste of normal consistency by adding from 18 to 25 per cent, by weight, of water to Portland cements and from 28 to 33 per cent to natural cements.

After being thoroughly troweled this paste is moulded into a ball and pressed into the inverted mould and the paste struck off even with the bottom of the mould. It is then turned over and the top struck off even. This is then placed in the moist-air cabinet and tested from time to time by the Vicat needle. To be accepted, Portland cements must not take an initial set in less than thirty minutes or natural cements in less than twenty minutes; Portland cements must not take a hard set in less than an hour or require more than ten hours to get hard set; natural cements must not take a hard set in less than thirty minutes or require more than three hours. The time is estimated from the moment of adding the water to the cement.

Soundness.— That cement paste which is left from the above test is moulded into three pats on glass plates about three inches by four inches in size. These pats are about one-half inch thick in the center and are drawn out to thin edges. As soon as made, the neat pats are placed in a moist-air cabinet and allowed to take their set. When the pats have hardened for twenty-four hours one is put in the steam of water at 212 degrees Fahr. for five hours. This is the “accelerated” or “hot-water” test; and if the pat, after being in the steam for five hours, shows no sign of blowing or cracking, it is reported as “good.” The other pats are given normal-air and water tests by being kept respectively in air and water maintained at from 60 to 70 degrees Fahr.

Tensile strength — Mortar.— For the tests for tensile strength, each sample is gaged separately with its proper proportion of standard crushed quartz sand, one part of cement to three parts of sand, parts by weight. As each sample is thus gaged it is put into a small pan and each is kept in the order of its number, so that the samples will not lose their identity. Each separate sample of cement and sand is thoroughly mixed dry and then from 9 to 11 per cent by weight of water is added to Portland cements and from 10 to 13½ per cent by weight to natural cements. The percentage used is such as will give a stiff mortar, which will show up water when the trowel is drawn heavily over it. This mortar is thoroughly troweled and is then put into the moulds.

Briquettes.— The mould, which is of brass and of the standard form recommended by the American Society of Civil Engineers, is

first filled with loose mortar and this carefully compacted by pressing down with the thumbs protected by rubber gloves. More loose mortar is placed in the mould and is pressed down as before. This makes about three-quarters inch of mortar in the mould, having been placed in about three-eighths-inch layers. The top layer is placed by striking a further addition of loose mortar with the back of the trowel. The briquette is then struck off even with the top of the mould. Two briquettes are made from each sample.

Treatment.—As soon as made, the briquettes are placed upon plates of glass and are placed in the moist-air cabinet, care being taken to keep them in their order so as to still retain their identity. After the mortar has hardened, the briquettes are removed from the moulds and replaced in cabinet. Twenty-four hours after gaging they are marked with a number which is given to each briquette consecutively as each is made, and are immersed and kept in water maintained at a temperature of about 60 to 70 degrees Fahr.

Breaking.—On the seventh day after gaging, the first test for tensile strength is given, and twenty-one days later, or on the twenty-eighth day after gaging, the second briquette of each sample is broken for tensile strength. A Fairbanks cement testing machine is used to obtain these results. All the operations are so conducted that there is perfect uniformity in the treatment of all the samples.

Strength.—Portland cements, mixed as described, must show an average of at least 150 pounds per square inch in tensile strength in seven days and an average of at least 240 pounds per square inch in twenty-eight days. Natural cements, mixed as described, must show a tensile strength of an average of at least 40 pounds per square inch in seven days and an average of at least 100 pounds per square inch in twenty-eight days.

Neat briquettes.—Tests for tensile strength of neat briquettes are seldom made, as the practice of this Department is to place the greater dependence upon the mortar tests. Whenever they are made, however, they are made and treated in a manner similar to that given mortar briquettes, excepting, of course, that a greater percentage of water is used — usually being about 1 per cent less than that used in gaging for the neat pats of that particular lot or brand. Neat briquettes of Portland cement, so made, must

show an average of at least 500 pounds per square inch in tensile strength in seven days; and neat briquettes of natural cement, similarly made, must show an average of at least 150 pounds per square inch in tensile strength in seven days.

Analysis.—The method of analysis used in examination of cements is that recommended by the committee of the New York Section — Society for Chemical Industry.

Specific gravity.—The tests for specific gravity are made as suggested by the American Society of Civil Engineers — the Le Chatelier apparatus being used as recommended.

Acceptance.—At the end of the seven-day tests, all results obtained on tests of samples of cement proposed for use on all works except the “Barge Canal” are submitted to Mr. Edmund F. Van Hoesen, Deputy State Engineer, while results for cement proposed for use of “Barge Canal” are submitted to Mr. Henry C. Allen, Special Deputy State Engineer, and if thought best, are held for the twenty-eight-day tests, the lots being accepted or rejected by them according as the results show that the cement passes or fails in the tests.

Our method of testing each sample separately for tensile strength has proven very satisfactory; in fact, by means of it, much poor cement has been discovered which would have stood the tests had all of the samples of the lot been blended. This method, however, makes necessary a larger equipment and a more complete system of operation than is necessary under the general method of testing a blended sample. Although the laboratory was enlarged during the past year, a further enlargement will probably be needed within another year. The effort, however, is made to maintain as complete a laboratory with as little expense as possible; but it is hoped that the laboratory and its results will be so complete as to be placed by experts as being among the best in the country.

The specifications for cement follow closely those recommended by the American Society for Testing Materials — varying from them only in some minor details.

Very respectfully,

RUSSELL S. GREENMAN,

*Assistant Engineer in Charge of Cement
Testing Laboratory.*

Report of the Land Bureau of the State Engineer's Department.

ALBANY, October 1, 1906.

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor*:

Sir.—I have the honor to present herewith a report on the various matters pertaining to the Land Bureau of your Department for the fiscal year ending September 30, 1906.

The Commissioners of the Land Office have applications for grants of land under water which are referred to this Department for examination and report; as are also a large number of miscellaneous matters relating to State lands. These matters require careful inspection and naturally consume a great deal of time.

The maps and papers are examined to determine their correctness and proper form, both from an engineering standpoint and to insure their conformity to the rules and regulations of the Land Office.

In some cases it is also necessary to visit and inspect the locations of the proposed grants to decide as to the advisability of making the grants on the lines of the application, or, if necessary, to have them modified.

It is also at times deemed advisable to deny some of these applications on account of interference with navigation or with the rights of the public.

Some applications were contested or had remonstrances filed against them, and hearings have been necessary to determine the rights of the several interested parties and report the outcome to the Commissioners of the Land Office.

Maps are now being made in this Department for the use of the State Engineer and Surveyor and the Commissioners of the Land Office, which will show the lands under water adjacent to the shores of Suffolk county that have been granted by the Com-

missioners. We now have finished maps of the counties of Richmond, Westchester, Kings, Queens, Nassau, Rockland, Orange, Ulster, Erie, Niagara, Albany, Greene, Dutchess and Columbia.

These maps have all been brought up to date and are of great value for reference in adjusting land grants.

Forty-four applications for grants of land under water were considered by this Department during the year; five were for railroad purposes, five were for purposes of commerce, and the remainder were for restricted beneficial enjoyment. The lands were in the following counties: Dutchess, Erie, Jefferson, Kings, Nassau, Oneida, Onondaga, Otsego, Queens, Richmond, Rockland, Suffolk, Ulster and Westchester.

The State Engineer and Surveyor has sold at public auction all of those unappropriated lands of the State which have been ordered to be sold by the Commissioners of the Land Office.

The records of the office show that there were held during the year twenty-three public auctions, at which fifty-four parcels of land were sold. The sum of \$36,742 was realized therefrom.

Of these lands forty-two parcels were acquired through the Comptroller's tax sales, nine from foreclosure of loan mortgages, one from abandoned canal lands, and two from escheated or unappropriated lands. The lands are located in the following counties: Albany, Cattaraugus, Chemung, Kings, Lewis, Livingston, Monroe, New York, Onondaga, Richmond, Rockland, Seneca, Tompkins and Ulster.

There has been the usual amount of correspondence and answering of inquiries from surveyors, lawyers, and others on matters pertaining to the original maps and descriptions of the Colonial and early State surveys filed in this office. The answering of such inquiries often requires much time and study, as there are frequently more than one survey of the same land made at different times by various surveyors, and none should be overlooked. These maps become more valuable as time passes; and as a large part of them are very old and describe lines of tracts of land which have become, in many instances, the boundaries of towns and counties, the value of those records becomes still greater.

For better preserving these records they have been rearranged, placed in bound volumes and indexed for convenience of reference. That it is the proper method for the care of these valuable papers, and that it affords greater facility of finding particular papers with the certainty that none have been overlooked, has already been fully demonstrated.

Respectfully,

MERRITT PECKHAM, JR.,

Assistant Engineer in Charge of Land Bureau

Report of the Bureau of Bridges of the New York State Engineer's Department.

ALBANY, N. Y., *September 30, 1906.*

Hon. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor:*

Sir.— I have the honor to report as follows for the fiscal year ending September 30, 1906:

On October 1, 1905, the total force of this Bureau consisted of seventeen men. During the year there has been a gain of eight and a loss of two, making the present total force twenty-three. During the year three Bridge Draftsmen have been promoted to the position of Bridge Designer, one Bridge Draftsman has been promoted to the position of Assistant Engineer, and one Junior Bridge Draftsman has been promoted to the position of Leveler. The force now consists of the Chief Bridge Designer, Assistant Chief Bridge Designer, nine Bridge Designers, one Assistant Engineer, one Mechanical Engineer and Draftsman, five Bridge Draftsmen, two Junior Bridge Draftsmen and three laborers.

More than ninety-five per cent of the work in this Bureau during the past year has consisted in the preparation of plans, specifications and estimates of cost for structures to be built in connection with the improvement of the canals as authorized by chapter 147, Laws of 1903. The work done includes plans for some forty highway bridge superstructures, and thirty-four substructures of the improved type described in my last annual report; also lock-gates, needle-dams and valves for thirteen locks and over 2,500 linear feet of movable dams for the Mohawk river, besides much miscellaneous work and many plans now in the process of preparation.

Plans and estimates have been prepared at the request of the Superintendent of Public Works for stairways for a bridge at Catharine street, Syracuse, and for a lighthouse at the outlet of Keuka lake.

The lift-bridge over the Erie canal at Willow street, Syracuse, was inspected several times during the course of construction and this Bureau was fully satisfied at the time of the final acceptance of the bridge that all work on it had been done substantially in accordance with the plans and specifications.

The rolled-steel shapes used for bridge superstructures are rolled at several of the principal steel-mills of the United States and are manufactured into trusses, floor-beams, etc., at the shops of the various bridge companies. On account of the large expense attaching thereto, it has been impracticable for this Bureau to have men in its employ located at the mills and shops for the purpose of making the necessary mill- and shop-inspection required by the specifications on what are comparatively small amounts of material. Such inspection has, therefore, been regularly made by a firm of inspecting engineers, appointed by the State Engineer and Surveyor. These engineers are able to make the inspection at low cost because their representatives inspect larger quantities of material for other purposes in connection with the materials inspected for the State. Reports of mill- and shop-inspection are regularly received and upon receipt are carefully examined in detail and placed on file.

Shop-drawings of all structural steel and machinery for new State bridges are submitted by the contractors for approval before any shop-work is done. These drawings are carefully examined and are approved after having been corrected to conform with the requirements of the contract-drawings and specifications.

During the session of the Legislature many approximate estimates of cost were made for various bridges and steel structures provided for by those bills which were referred to the State Engineer.

During the year seven existing bridges over the canals have been examined at the request of the Superintendent of Public Works. Reports as to the condition of these bridges, with recommendations as to necessary repairs, have been made to the State Engineer. Plans for strengthening existing bridges or for building new bridges over the canals, submitted to the Superintendent of Public Works by street-railway companies in connection with

petitions for permission to cross the canal, have been carefully examined and reports made thereon to the State Engineer.

Under section 145 of chapter 568 of the Revised Statutes, many town officers throughout the State have made requests for the examination and approval of stress-sheets, shop-drawings, etc., for new bridges or for an examination of both old and new structures. Upon receipt of such request, examination has been made as promptly as possible.

Requests for examination of town bridges are frequently made after the bridge is entirely completed, at which time it is impracticable to amend the contract-plans or specifications or to certify that the quality of the materials used is satisfactory. It is, therefore, often impossible to give unqualified approval to the completed structure. Far more satisfactory results are obtained when the town submits contract-plans and specifications for approval before the contract is signed. All town bridges of whatever span should be designed to conform in all respects to the best modern specifications and to carry in safety a steam road-roller rated at ten tons (actual weight when loaded 13 tons), unless the authorities of the town should, after due considerations, decide that for special reasons it is not necessary to build a structure capable of safely carrying so great a load. Provisions should also always be made for the mill-inspection of material and the shop-inspection of workmanship by some competent firm of inspecting engineers. To secure these results, it is suggested as desirable that the Highway Law of the State be amended to require that, before contracts for new highway bridges are signed, the plans and specifications therefor shall be examined and approved by the State Engineer.

Constant effort has been made to do the work assigned to this Bureau with promptness and at as low a cost as is consistent therewith.

Respectfully submitted,

WM. R. DAVIS,

Chief Bridge Designer.

Report on Experimental Oiling of State Highways.

ALBANY, N. Y., *December 31, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor:*

Dear Sir.—I respectfully submit the accompanying report relative to the experimental oiling of the highways of New York State during 1906.

The methods for the construction of the State highways as adopted and improved upon by the State Engineer and Surveyor have reached such a stage of perfection that they are subjected to but little criticism by the public and those in a position to judge of the merits of the same. These methods having been established, the subject next to be considered and which is of the greatest importance is that of the maintenance and protection of the highways against the various influences tending to destroy the wearing-surface of the road and which are detrimental to the general requisites of a good road. The principal sources of these evils are the wear from the calks of horses' shoes which tend to loosen and ravel the surface of the road, so that when subjected to a heavy rain this wearing-surface is washed away or when dry is blown away by the winds or thrown to the roadside by the high-speeding automobiles. Added to this is the excessive wear to which the roads are subjected by the tires of the automobiles which tend to create a vacuum and thus by suction the finer or binding particles are drawn out and blown away, leaving the larger stones exposed and making the surface rough and uneven, and to this wear there is still added that from the use of the many "anti-slipping" shoes and chains attached to the tires.

Drainage and grades can be made to meet their requirements in the construction of the road, but to overcome the destructive influences to which the road is subjected, a remedy must be procured which will meet the general requirements in preventing the dust nuisance, preserving the surface of the road, and lessening the wear from the traffic, thereby increasing the life and decreasing

the cost of maintenance of the highways. The remedy to be sought should not only meet the above requirements but should be such as not to entail excessive expense nor be offensive to the traveling public and detract from the pleasures of driving or autoing.

Sprinkling with water has, until recently, been the sole means of allaying the dust nuisance, but, as this means is advisable and practicable only in cities or parks having a water supply, its use is not applicable for use on country highways. Such conditions existing, experiments of a more or less successful nature have been carried on in different sections of the country with a view of ascertaining an economical and practical method of accomplishing the desired results. These experiments have consisted chiefly in sprinkling with a solution of calcium chloride or with oil, and resurfacing the highway with various tar products and screenings, forming an asphaltic surface to the road. In California and Kentucky the practice of oiling has been extensively used with success, as it has also been in France. Using tar products has been more extensively used abroad, although it has met with success in many localities in the United States.

Where oil has been used, two kinds have been experimented with, the Pennsylvania oil, or those of a similar composition, having a paraffine base, and the Kentucky or similar oils having an asphaltum base. These latter appear from all experiments to be more advisable, inasmuch as they give a more lasting and serviceable wearing-surface and are free from the objectionable features of the paraffine oils, such as the offensive odor and tendency to allow the formation of a dust which, when thrown by the wagon wheels, stains garments and is very irritable to the eyes. In Nassau county, N. Y., the first experiments were with a cheaper oil, having a paraffine base, but the results obtained were not as satisfactory as those from the use of the Kentucky oil having an asphaltum base, which not only penetrates and combines with the road material for some depth, but forms a light asphaltic surface on the road. On highways where this has been used, the dust nuisance has been obviated and from all indications the road-surface improved in its wearing qualities and made impervious to water,



METHOD OF APPLYING OIL TO ROAD SURFACE.



UNLOADING OIL FROM TANK CAR TO SPRINKLER.

STATE EXPERIMENTS.

After an investigation of the various methods and results of treating roads with oil, tar or other hydro-carbons as a means for their preservation and for the elimination of the dust nuisance, the experimental oiling of New York roads was undertaken by the State Engineer and Surveyor in July, 1906, with a view of determining its efficiency, cost and advisability as a means of accomplishing the desired ends.

Various methods of application were tried during August, September and October, on macadam, gravel and sand roads in Oneida, Albany and Orange counties, and the results of the different methods are to be noted next spring after the roads have been subjected to the wear of the fall traffic and the influence of winter conditions.

APPARATUS.

The sprinkling cart used to distribute the oil on the road consisted of a 600-gallon steel tank with a wooden head, made by the Etnyer Co., fitted with a White patent oiler, such as is used in California, where the sprinkler is made. The characteristic features of this type of sprinkler are: that the oil is distributed directly downward upon the road-surface, and that the width of the application may be regulated from 18 inches to six feet, as can also the amount of oil applied, by the manipulation of levers by the operator, who sits in the rear of the tank. From his position the operator can adapt the flow of oil both as to quantity and width, as the condition of the road may demand.

To unload the oil from the 6,000-gallon U. T. L. cars, in which it was received, a diaphragm pump was used, fastened to the dome of the car. By means of an iron chute the oil was conveyed from the pump to the sprinkler tank. This method was rather cumbersome and unhandy and entailed the loss of too much time in setting up the pump and in unloading the oil, but it was the best and cheapest available at that time. However, it can be greatly improved upon when the oiling is undertaken on more than an experimental basis.

OIL.

The oil used was that known as the Raglan oil, obtained through the Standard Oil Co., from their wells at Salt Lick, Kentucky, at a cost of $4\frac{1}{2}$ cents per gallon, f. o. b. at the various places where used. This is a crude oil, being black and heavy, due to the presence of asphalt, of which the producers claim a 30% to 35% base. When cold, the flow of the oil is slow and sluggish, but, when warm, it flows with a reasonable degree of rapidity.

APPLICATION.

On the several sections of road treated the methods of application varied, some being sanded, others swept, and some treated, as left by the traffic. These methods I have noted in the reports of the separate pieces of road treated. While the oil was being applied, traffic was not suspended, but the people chose the sides of the road not oiled, for a few days until the oil had been taken up by the surface and did not have a tendency to adhere to the vehicle tires and to be thrown upon the garments of the people riding or on vehicles. From observation during the experiments it was noted that the best results were obtained when the surface of the road was warm and dry and the day was also clear and warm.

ONEIDA COUNTY.

Utica-Paris Road.—The first section of road to be treated was the Utica-Paris macadam road, five and one-quarter miles in length, on which 6,360 gallons of oil were used, the width of surface being from 10 to 12 feet. From the end of the asphalt pavement in Utica to the top of the cemetery hill one application was given to the surface, as left by the traffic. From the cemetery south, for 800 feet, a single coat of oil was used, but for the first 400 feet, the surface was sanded one-quarter of an inch in depth, immediately after oiling, and the next 400 feet sanded five hours after oiling. From the Casino park south 1,200 feet the road received a double application, the second being applied during the day following the first application. From this point south to the end of the road one coating was given, the refuse on the surface having been previously swept off with a sweeper and with brooms.

The day following the treatment of the section from Washington Mills south, it rained for twelve hours, which must be borne in mind when judging the effect of the oil upon the road, as it washed some of the oil away before it had been taken up by the surface material. Where one application is referred to, it is at the rate of 1,200 gallons per mile, as nearly as could be regulated by the levers of the sprinkler.

Two weeks after the treatment an inspection showed the section sanded to be in better condition than the others and all the sections treated were free from any dust from automobiles passing at a high rate of speed.

The oil was received on the switch at Washington Mills, which is approximately at the center of the road, making the average haul 1.25 miles.

In figuring the cost I have included the expense of the State labor on the work, which will tend to make the expense higher than it could be done for in practice, but which might be counterbalanced by the cost of transporting the apparatus from one section to another.

Cost.

Team (sprinkler), 2½ days, at \$4 per day.....	\$10 00
Team (sweeper), ½ day, at \$4 per day.....	2 00
Sweeper, 1 day, at \$1 per day.....	1 00
Labor (pumping and sweeping).....	4 50
State labor, 7 days, at \$4 per day.....	28 00
State labor, expenses (say)	15 00

\$60 50

$$\begin{aligned} \$60.50 \div 6,360 &= \$.0095 \text{ per gallon, to apply,} \\ &\quad .0478 \text{ per gallon, cost of oil,} \end{aligned}$$

\$.0573 per gallon, total cost.

Using 1,200 gallons per mile for 10 feet width would cost \$68.76 per mile.

ALBANY COUNTY.

The roads treated in Albany county were the Loudonville macadam road, the macadam roads in the village of Delmar and a sand road at Elsmere.

Loudonville Road.—The Loudonville road was treated for a distance of about one mile, adjoining the piece upon which tarvia has been placed, the width of application being 18 feet and the amount of oil used 2,300 gallons. The oil was applied to the road as left by the traffic, having a light coating of the finer wearing material upon the surface. Any oil which collected in the depressions in the road was swept out by men with brooms, who went over the road a short time after the oil was applied, thus lessening the tendency to spatter over vehicles and their occupants passing over the road after oiling. Several weeks after the oiling, the road presented a surface free from dust and which was much more resilient and more agreeable than the section not treated. The average haul on this piece of work was 1.75 miles from the Tivoli street switch at North Albany, where the car was placed.

Cost.

Team, 2 days, at \$4 per day.....	\$8 00
Labor, 6 days, at \$1.75 per day.....	10 50
State labor, 2 days, at \$4 per day.....	8 00
State labor, expenses	4 00
	<hr/>
	\$30 50
	<hr/>

$\$30.50 \div 2,300 = \$.0133$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

$\$.0611$ per gallon, total cost.

For 18 feet width, 2,300 gallons per mile cost \$140.53.

The roads oiled in the village of Delmar were the Kenwood avenue road through the village, and the Delmar-Slingerlands road.

Kenwood avenue and Delmar-Slingerlands Roads.—A few days previous to the application of the oil, the Kenwood avenue road and the Slingerlands road, from the railroad crossing to its intersection with the Kenwood avenue road, had been resurfaced with



KENWOOD AVENUE, DELMAR, ALBANY COUNTY.
Resurfaced macadam road, after oiling.

$\frac{3}{4}$ -inch Saratoga trap-rock, sand being used as a filler. An excess of sand had been used on the Kenwood avenue piece, which is also very shady; these conditions, together with the fact that it rained the day following the application, made this portion sticky, and the result was not as good as on the stretch of the Slingerlands road from the railroad to the Kenwood avenue intersection, where very little sand had been used with the stone. The length of the stretch here treated was about 1.5 miles, the width, 10 feet, 2,600 gallons of oil being used; the average haul was 0.75 mile.

Cost.

Team, $1\frac{1}{2}$ days, at \$4 per day.....	\$6 00
Labor, 3 days, at \$1.75 per day.....	5 25
State labor, $1\frac{1}{2}$ days, at \$4 per day.....	6 00
State labor, expense	2 75
	<hr/>
	\$20 00
	<hr/>

$\$20.00 \div 2,600 = \$.0076$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

 $\$.0554$ per gallon, total cost.

Elsmere Road.—A short stretch of unimproved sand road in the village of Elsmere was shaped with a drag harrow and then treated with oil. The length of the section was about 0.25 mile, 800 gallons being applied on a width of 10 feet. After applying the oil the road was again harrowed to mix the oil thoroughly with the sand. The average haul was 0.8 mile.

Cost.

Team, $\frac{1}{2}$ day, at \$4 per day.....	\$2 00
Labor, $\frac{1}{2}$ day, at \$1.75 per day.....	87
State labor, $\frac{1}{2}$ day, at \$4 per day.....	1 00
	<hr/>
	\$3 87
	<hr/>

$\$3.87 \div 800 = \$.0048$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

 $\$.0526$ per gallon, total cost.

Delmar-Slingerlands Road.—A stretch 0.5 mile long on the Slingerlands road from Kenwood avenue south was oiled for a width of 10 feet, the surface being treated as left by the traffic, 600 gallons of oil being used and the average haul being 0.5 mile.

Cost.

Team, $\frac{1}{4}$ day, at \$4 per day.....	\$1 00
Pumpman, $\frac{1}{4}$ day, at \$1.50 per day.....	38
State labor, $\frac{1}{4}$ day, at \$4 per day.....	1 00
State labor, expense ..	50
	<hr/>
	\$2 88
	<hr/>

$\$2.88 \div 600 = \$.0048$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

 $\$.0526$ per gallon, total cost.

ORANGE COUNTY.

Chester-Goshen Road.—The first gravel road upon which the oil was applied was the Chester-Goshen road, No. 156, this being treated for a distance of 2.8 miles. The road had been resurfaced two weeks previously, thus presenting a surface which was somewhat loose, except in the wheel tracks, where it had been firmly compacted. In order to learn the results to be obtained from various widths and amounts of oil applied, several methods were used on this road, as shown in the following table, which should be used for reference in inspecting the road in the spring of 1907. Last spring the sections from Station 101 to Station 105 and from Station 88 to Station 91 were broken up when the frost went out of the ground, and presented a poor wearing-surface. On these sections an extra heavy application was made, in order to see if the oiled surface would not protect the road-bed and lessen the action of the frost.



View before oiling.



View after oiling.

CHESTER-GOSHEN ROAD, ORANGE COUNTY.

REPORT ON EXPERIMENTAL OILING OF STATE HIGHWAYS. 279

Station.	Width.	Approximate amount of oil applied.
	<i>Feet.</i>	<i>Gallons.</i>
22 to 63.....	7½.....	600
62 to 83.....	6.....	450
83 to 88.....	9, lap 1½ in middle.....	125
83 to 88.....	9, extra heavy.....	150
91 to 101.....	7½.....	200
101 to 105.....	9, extra heavy.....	275
105 to 182.....	9, lap 1½ in middle.....	1,600

The total amount of oil used was 3,400 gallons, on a length of 2.8 miles, the widths varying as shown in the table; the average haul was 2.5 miles.

Cost.

Team, 2 days, at \$4 per day.....	\$8 00
Pumpman, 2 days, at \$1.50 per day.....	3 00
State labor, 6 days at \$4 per day.....	24 00
State labor, expense	15 00
	<hr/>
	\$50 00
	<hr/>

$\$50.00 \div 3,400 = \$.015$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

 $\$.0628$ per gallon, total cost.

No treatment was given the road before the application of oil and from reports and the results observed a short time afterward, the dust was entirely laid and no trouble was experienced from the oil adhering to the tires of vehicles.

Newburgh-Woodbury Road.—On the Newburgh-Woodbury road, No. 42, which is also a gravel road, but had a very hard and compact surface, fourteen hundred gallons were applied, on a distance of one mile, the width covered being nine feet. The road was oiled as left by traffic, the average haul being 1.75 miles.

Cost.

Team, 1 day, at \$4 per day.....	\$4 00
Pumpman, 1 day, at \$1.50 per day.....	1 50

State labor, 3 days, at \$4 per day.....	\$12 00
State labor, expense	6 00
	<hr/>
	\$23 50
	<hr/>

$\$23.50 \div 1,400 = \$.0167$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

$\$.0645$ per gallon, total cost.

Newburgh-Shawangunk Road.—On Road No. 161, Newburgh-Shawangunk, out of Newburgh, a section of the completed road, one mile in length, was oiled as left by traffic, there being about a quarter of an inch of dust and fine material on the surface. Twelve hundred gallons were used on a strip 8 feet wide, the average haul being 1.75 miles.

Cost.

Team, 1 day, at \$4 per day.....	\$4 00
Pumpman, 1 day, at \$1.50 per day.....	1 50
State labor, 3 days, at \$4 per day.....	12 00
State labor, expense	6 00
	<hr/>
	\$23 50
	<hr/>

$\$23.50 \div 1,200 = \$.019$ per gallon, to apply,
 $.0478$ per gallon, cost of oil,

$\$.0668$ per gallon, total cost.

SUMMARY.

Road.	Material of road.	Average width oiled.	Length oiled.	Gallons applied.	Cost per gallon.	Average haul.
		<i>Feet.</i>	<i>Miles.</i>			<i>Miles.</i>
Utica-Paris.....	Macadam...	10 to 12..	5	6,360	\$.0573	1.25
Loudonville.....	Macadam...	18.....	1	2,300	.0611	1.75
Kenwood avenue.....	Macadam...	10.....	1.5	2,600	.0554	.75
Elsmere.....	Sand.....	10.....	.35	800	.0526	.8
Delmar-Slingerlands.....	Macadam...	10.....	.5	600	.0526	.5
Chester-Goshen.....	Gravel.....	8.....	2.8	3,400	.0628	2.5
Newburgh-Woodbury.....	Gravel.....	9.....	1.0	1,400	.0645	1.75
Newburgh-Shawangunk..	Macadam...	8.....	1.0	1,200	.0668	1.75

Respectfully submitted,

ARNOLD G. CHAPMAN.

REPORT
OF
Co-operation of United States
Geological Survey

WITH
STATE ENGINEER AND SURVEYOR

OF THE
STATE OF NEW YORK.

1906.

Co-operation of United States Geological Survey.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,

WASHINGTON, D. C., *November 23, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor,*
Albany, New York:

Sir.—I have the honor to make the following preliminary report of the results of the co-operative topographic survey of New York for the year 1906-7:

Allotments.

The terms of the supplemental agreement signed by us June 7 and 8, 1906, provided for the continuation of the co-operative topographic survey of the State, and extended the original agreement entered into between us in May, 1904, to cover the details of such co-operation. In this supplemental agreement we provided that the State and the United States should each expend \$9,500 during the Government fiscal year ending June 30, 1907. Under the terms of our agreement of the previous year the State was able at that time to allot only \$600 to co-operation for 1905-6, and I undertook to provide a much larger sum, \$7,000, in order that the work might be prosecuted during the season of 1905 with some reasonable degree of vigor. The sum thus expended by the Federal Survey in excess of the State in 1905-6, was balanced by less expenditure upon the part of the Federal Survey than upon the part of the State during the current year 1906-7, in such wise as to balance the expenditures by the two organizations during the two fiscal years ending June 30, 1906, and June 30, 1907.

The effect of this arrangement has been to so involve the work of the two years that the results should be summarized here with the expenditures.

There has been allotted and the expenditure has been obligated during the two years covering the field seasons of 1905 and 1906 a total of State and Federal funds each amounting to \$10,100, or in all, \$20,200.

Results.

As reported by me December 21, 1905, four atlas sheets were surveyed in that season: namely, Eden, in Erie and Cattaraugus counties; Port Leyden, in Lewis and Oneida counties; Sangerfield, in Madison, Otsego, and Oneida counties; Winfield, in Herkimer, Madison, Oneida, and Otsego counties. The total area of this mapping was 865 square miles. In addition some preliminary work was done on Goshen (N. Y.-N. J.), Loon Lake, Bath, Cooperstown, Delhi, Monticello, Port Jervis (N. Y.-N. J.-Pa.) and Potsdam quadrangles.

During the season of 1906, just closed, three surveying parties were maintained in the field throughout the year. They have completed the survey, for publication on the scale of about 1 mile to 1 inch, and with a contour interval of 20 feet, of 636 square miles of the area of the state. Incidentally, in connection with the survey of Goshen and Port Jervis sheets, they surveyed portions of the states of New Jersey and Pennsylvania, included within the areas of these sheets. None of the expenditure incurred on this work in other states was borne by the State of New York, the whole being borne by the Federal survey independently or in co-operation with the adjoining states.

The results of the mapping of the area above designated will be represented on the following four sheets: Goshen (N.Y.-N. J.), in Orange county; Loon Lake, in Franklin county; Port Jervis (N. Y.-N. J.-Pa.), in Orange and Sullivan counties; Potsdam, in St. Lawrence county.

In addition to the above completed mapping, preliminary work, including plane-table triangulation, primary leveling and road traverse, was completed on Neversink sheet, Delaware, Sullivan and Ulster counties, and Cooperstown sheet, Otsego county.

An inspection of the topographic mapping of the season of 1904 on Massena and Brier Hill sheets, had developed the fact that, whereas the work had been executed with all needed accuracy as to cultural features, elevations and hydrography, the topographer had not succeeded in depicting with desired truthfulness to nature the topographic forms as expressed by the contouring. It was, therefore, found necessary to partly revise and resketch this topography prior to publication, in order that the results should be up to the high standard heretofore set and maintained for this co-operative survey. This work required 8 days upon Massena sheet, and 10 days upon Brier Hill.

Very respectfully,

H. C. RIZER,

Acting Director.

CO-OPERATIVE TOPOGRAPHIC SURVEY OF THE STATE OF NEW YORK.

As shown in the report from the Director of the United States Geological Survey, the co-operative topographic survey of the State was continued during the field season of 1906 as an extension of the field work and the allotments for the season of 1905. The total sum available for the two years was \$20,200. The expenditure during 1905 amounted to \$599.58 of State funds, and \$6,248.85 of Federal funds, a total of \$6,848.43. During the current year to the close of June 30, 1907, there will have been expended \$9,500 of State funds and \$3,851.57 of Federal funds, a total for the year of \$13,351.57. Of this gross allotment for the current year about \$10,000 has been so far expended, the balance being reserved for the payment of office salaries involved in the drafting of the maps and for preliminary field work in the spring of 1907.

RÉSUMÉ OF RESULTS.

The immediate charge of the co-operative survey was continued under Mr. H. M. Wilson, geographer in charge of the Eastern Division of Topography of the U. S. Geological Survey. Mr. J. H. Jennings, topographer, continued in charge of the section including the state of New York.

During the season of 1906 no funds were expended upon the extension of either primary control or of precise levels, since sufficient data of this kind remained available from preliminary work of the previous years to furnish the necessary primary control for all topographic mapping for the immediate future. The selection of the regions into which the co-operative work was extended during the past season was governed chiefly by the desirability of completing the sheets previously started with a view to securing the final mapping of the Adirondack region, of the watersheds of streams available for power in the St. Lawrence basin, and of data needed in connection with a more complete knowledge of the water resources of southeastern New York and available for New York city.

During the season of 1906 there were run 132 miles of primary spirit levels, and 816 miles of secondary levels, in the course of which 6,935 elevations were determined, of which 28 were permanently marked with bronze or aluminum tablets. There were run 1,271 miles of road traverse. The topographic mapping was completed of four quadrangles, covering a total area of 636 square miles within the state. The resulting maps will include upon their surfaces the areas of 64 square miles in New Jersey, and 7 square miles in Pennsylvania. These sheets are Goshen, in Orange county, N. Y., and Sussex county, N. J., Loon Lake, Franklin county; Port Jervis, in Orange and Sullivan counties, N. Y., Sussex county, N. J., Pike county, Pa., and Potsdam, in St. Lawrence county. Preliminary work was extended so as to complete all instrumental control on Neversink quadrangle, in Delaware, Sullivan and Ulster counties, and on Cooperstown quadrangle, Otsego county. This included 41 miles of spirit levels which determined 442 elevations, of which 4 have been marked by permanent metal tablets. Also 374 trigonometric locations by plane-table triangulation and 259 miles of road traverse.

The completed output of work during the past season has been below the average because of the extreme difficulty and expense of mapping on all four quadrangles. The Loon Lake and the southeastern corner of the Potsdam quadrangle, both in the Adirondacks, required a great amount of foot traversing through the woods in the mountains. There was also a great deal of heavy mountain work requiring foot traverse upon the Port Jervis sheet, and such work is both slow and expensive.

FIELD WORK, NEW YORK, 1906.

COUNTIES.	Sheets.	Topographers.	Number of days worked.	Area mapped—square miles.	Trigonometric locations—number.	LEVELS.			Traverse—miles.
						Bench marks—number.	Spirit levels—miles.	Elevations—number.	
Orange.....	Goshen.....	{ J. H. Jennings... W. O. Tufts... }	45	173	.....	.....	152	1,066	79
Franklin.....	Loon Lake.....	{ G. Young... F. Graff, Jr... }	94	99	.....	5	27	50	369
Orange.....	Port Jervis.....	{ G. Young... W. O. Tufts... }	68	151	.....	.....	.....	241	258
St. Lawrence.....	Potsdam.....	{ G. Young... C. E. Cooke... }	89	213	13	19	89	348	306
<i>Total sheets completed in field.</i>									
			296	636a	13	24	116	791	6,493
Delaware, Otsego.....	Cooperstown.....	{ C. E. Cooke... F. A. Dykeman... }	29	.....	208	4	16	26	302
Delaware, Sullivan, Ulster.....	Neverink.....	{ G. Young... }	14	.....	166	.....	.....	.....	140
<i>Total sheets unfinished in field.</i>									
			43	.....	374	4	16	25	442
St. Lawrence.....	Brier Hill.....	H. Munroe.....	5	100	.....	.....	.....	.....	.....
St. Lawrence.....	Massena.....	H. Munroe.....	8	218	.....	.....	.....	.....	.....
<i>Total revision completed in field.</i>									
			13	318	.....	.....	.....	.....	.....
Orange.....	Greenwood Lake.....	G. Young.....	.....	.....	.....	.....	.....	.....	.....
<i>Total revision unfinished in field.</i>									
			.....	.....	.....	.....	33	245	.....
Allegany.....	Angelica.....	G. Young.....	.....	.....	.....	.....	.....	.....	25
Cattaraugus, Erie.....	Eden.....	H. L. Johnston.....	.....	.....	.....	.....	.....	32	138
<i>Additions to sheets.</i>									
			.....	.....	.....	.....	.....	32	138
			.....	.....	.....	.....	.....	.....	25

a In addition to the above 43 square miles is mapped over sheet edges.

PROGRESS TO DATE.

The tabular list of all the atlas sheets mapped in co-operation and independent thereof, was published in my last annual report. There is appended hereto such a list including the work of the past season.

Prior to this season there had been surveyed 204 atlas sheets, representing the topography of 37,313 square miles, and there had been mapped, in addition, 197 square miles on three partially surveyed sheets. To the close of the present year, therefore, there have been surveyed and mapped 208 atlas sheets, representing the topography of 38,146 square miles.

PUBLICATION OF TOPOGRAPHIC SHEETS.

There have been engraved and published to the close of the present year 227 atlas sheets, covering an area of 36,709 square miles. A number of these sheets are combinations of the separate atlas sheets or are reductions of the same on the less detailed scale of about 2 miles to 1 inch. These smaller scale maps are found most useful, as each represents within the limits of an atlas sheet of convenient size an area four times as great as that represented upon the larger scale maps, or about 880 square miles per sheet. These additional sheets are published by the Federal Survey at no expense to the State.

AVERAGE EXPENDITURE AND PROGRESS.

The total outlay since the inception of this work has amounted to about \$486,107, of which the State has expended \$220,375, or about \$26,000 less than the Federal Government. The average cost of mapping to date has been \$13.24 per square mile. The area of the state remaining unmapped at the close of the last season was 11,660 square miles, so that there now remain 11,024 square miles yet to be mapped, which area will be represented upon 37 atlas sheets. Of this area all but about 3,300 square miles is now controlled by primary triangulation and precise leveling, executed by the co-operative survey, and is ready for final topographic mapping.

RECOMMENDATIONS.

The co-operative survey of the state has made such progress toward completion that, in view of its importance in the development of the resources of the state, it should be continued steadily to completion. The area of the state is 49,170 square miles. Of this there have been mapped to date 38,149 square miles, leaving only about 11,000 square miles yet to be mapped. At the rate of the annual appropriation maintained for a few years, namely, \$20,000, this would have taken a little over three years for completion.

The topographic maps resulting from this Survey are of primary importance to the State officials of New York, especially in view of the great fund of \$50,000,000 now available toward improvement of public highways. They are the essential source of the preliminary planning of such highway improvements. They are also of great value to the State in connection with the work of the Forest Preserve Board and of the State Engineer and Surveyor in connection with the Barge canal improvements and the maintenance of existing canals and reservoirs. To the people of the state, aside from the State Government, they are of the highest value in connection with the improvement and construction of railroads, trolley lines, municipal water-supplies and sanitation, etc.

That this work may be pressed to early completion I earnestly recommend the enactment of legislation similar to that contained in the appropriation for sundry supplies for the maintenance of the office of the State Engineer for the past year, calling for an amount of at least \$10,000 for continuation of this work during the year 1907. On the basis of an appropriation of this size, doubled as it will be by an allotment of a similar sum by the Federal Government, it will still take at least six years to complete the map of the state.

FIELD WORK OF 1906.

During the field season of 1906 Mr. J. H. Jennings, topographer, in charge of the northeastern section of the Federal Survey, was continued in supervisory charge of work in the state of New York. Field work was commenced in May and four parties

were maintained in the field throughout the larger portion of the year, the season closing in November.

The largest party, in charge of Mr. C. E. Cooke, topographer, completed the topographic mapping of Potsdam quadrangle, in St. Lawrence county. This work was more slow and expensive than anticipated because the southeastern corner of the quadrangle lies within the foothills of the Adirondacks, which are very difficult to survey owing to the detailed topography hidden by burnt timber and slash. Under Mr. Cooke's direction preliminary work of traversing roads and determining elevations by levels for the Cooperstown quadrangle, in Delaware and Otsego counties, was completed.

Mr. W. O. Tufts, assistant topographer, was in charge of a party engaged in mapping the Goshen quadrangle, in Orange county. Mr. Gilbert Young, assistant topographer, mapped the Port Jervis quadrangle, in Orange county. These two men, however, assisted each other, both working a portion of each sheet. Later in the season Mr. Jennings aided Mr. Tufts in the completion of Goshen. In addition to mapping the State portion of these sheets, these parties completed, not in co-operation with the State of New York, but in co-operation with the State of Pennsylvania or independent of either, the mapping of those portions of these two quadrangles which overlap New Jersey and Pennsylvania. The result was to complete the quadrangular areas and thus render them ready for publication.

Mr. Fred Graff, jr., topographic aid, with the assistance for a short time of Mr. Gilbert Young, assistant topographer, completed the mapping of Loon Lake quadrangle, in Franklin county. This area lay wholly in the Adirondacks and was very slow and expensive of survey.

Mr. Gilbert Young, in connection with his work on Port Jervis had charge of a party which completed the preliminary traverse of roads for the control of Neversink quadrangle, in Delaware, Sullivan and Ulster counties.

In addition to the regular field work of topographic mapping, some incidental revision was done, especially on the New York portion of Greenwood Lake sheet, in Orange county, and on the Angelica and Eden sheets, to bring them up to date by the addition of roads and railways.

PRIMARY CONTROL.

Practically no primary control of moment was executed in the state during the season of 1906. This was because in the years 1903 and 1904, when the appropriations were larger, sufficient of this preliminary work was executed to provide for the needs of the topographers during the succeeding year, on the assumption that the appropriation would be continued at the amount of \$20,000, which had been appropriated for several years prior to 1905. In consequence there remains available primary control, including both primary triangulation for horizontal control and precise levels for vertical control, executed prior to this season, an amount sufficient to furnish data upon which to extend future topographic surveys over 24 atlas sheets, making a total area of nearly 5,300 square miles. There remains uncontrolled by primary triangulation and precise levels only about 10 quadrangles.

WOODED AREAS.

As stated in my last annual report, the U. S. Geological Survey was preparing to indicate hereafter the areas of all woodland within the state upon its regular topographic atlas sheets by an appropriate symbol. There were issued from the press during the past season the following atlas sheets, on which, in addition to roads, houses, and other similar features, the wooded areas have been indicated by a faint green tint. This is printed in such manner as not to obscure the other topographic features and yet to show them distinctly and with accuracy of outline. The sheets thus published are: Angelica, in Allegany county; Kasoag, in Lewis, Oneida and Oswego counties; Lake Pleasant, in Hamilton county; Piseco Lake, in Fulton, Hamilton, Herkimer counties; Sangerfield, in Madison, Oneida and Otsego counties; and Tupper Lake, in Franklin, Hamilton and St. Lawrence counties.

CLASSIFICATION OF ROADS.

The co-operative survey is now distinguishing between macadam or built roads, and dirt roads. The resulting maps of the past two seasons show by an appropriate symbol all of the metalled roads, including not only those built by the State, but such as have been built prior to State aid, and which are in first-class condition.

This distinction of classes of roads will be found of great assistance to automobilists as well as to farmers and the traveling public in general.

OFFICE WORK.

All the atlas sheets completed in the season of 1905 were drawn up during the office season of 1905-6, and were turned over to the engraver for publication. Those remaining in the hands of the engraver are the following, representing an area of 856 square miles:

Sheet names.	Counties.	Area— square miles.
Eden.....	Erie, Cattaraugus.....	211.41
Massena.....	St. Lawrence.....	209.00
Port Leyden.....	Lewis, Oneida.....	216.40
Winfield.....	Herkimer, Madison, Oneida, Otsego.....	219.04
		855.85

All the atlas sheets completely mapped in 1904-5 have been engraved and published, excepting Massena, which was held up for revision during the season of 1905-6.

ATLAS SHEETS ENGRAVED AND PUBLISHED.

The following atlas sheets have been completed by the engraving division of the U. S. Geological Survey since the publication of my last annual report, at which time the total number of sheets engraved was 212 and the area represented thereon was 33,950 square miles. The total to date is, therefore, 227 atlas sheets, representing an area of 36,709 square miles:

Sheet names.	Counties.	Area— square miles.
Angelica.....	Allegany.....	220.78
Attica.....	Erie, Genesee, Wyoming.....	219.04
Brier Hill.....	St. Lawrence.....	100.00
Caratunk a.....	Broome, Cortland, Tioga, Tompkins (884.85).....	.....
Clymer.....	Chautauqua.....	221.65
Depew.....	Erie.....	219.04
Ellenville.....	Orange, Ulster, Sullivan.....	223.36
Highmarket.....	Lewis.....	216.40
Kasoag.....	Lewis, Oneida, Oswego.....	217.28
Lake Pleasant.....	Hamilton.....	217.28
Mexico.....	Onondaga, Oswego.....	217.28
Piseco Lake.....	Fulton, Hamilton, Herkimer.....	217.28
Red Mills.....	St. Lawrence.....	36.00
Sangerfield.....	Madison, Oneida, Otsego.....	219.04
Tupper Lake.....	Franklin, Hamilton, St. Lawrence.....	214.61
		2,759.04

a Caratunk sheet, on scale of 1:125,000, is composed of Apalachin, Dryden, Harford and Owego sheets, on scale of 1:62,500.

The above is a résumé of the work accomplished by the co-operative topographic survey of New York. The resulting topographic maps are of practical value in planning engineering projects, improvement of highways, construction of electric and steam railways, and studies of the sewerage and water-supplies of cities. They are of political value in connection with questions relating to legislative matters, as the subdivisions of counties, the assignment of jurisdiction of State institutions, boundaries of towns, counties, and their relation to natural features. They are of administrative value in connection with questions of official control of public works, reservations, highways, and jurisdictions of courts. They are of great value in connection with questions concerning the use of timber lands. They are of the highest importance to the military affairs of the State and Federal Governments in planning works of defense, encampments, marches, maneuvers, etc. They are of educational value by presenting an exact knowledge of the country, by serving teachers and pupils with studies of home geography, and the relations of hills, valleys and slopes to industrial activities and to watercourses. They are of statistical value for the representation of facts relating to population, industries, products, etc.

Finally, they are of the highest economic importance as a means of showing location, extent, and accessibility of lands, waters, forests, and mineral resources. They are indispensable to State and Federal Bureaus, to owners, investors, and corporations in connection with inquiries into these matters. Their main importance, however, is as basis upon which to study the geological formations and the relations of the various coal, oil, and gas bearing formations one to another, their depth below the surface and the probable extension of such resources into unexploited areas; also as a basis for soil surveys for the determination of the agricultural value and properties of the lands.

*Topographic surveys in New York, by quadrangles, to December
31, 1906.*

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK:	<i>Sq. miles.</i>			<i>Feet.</i>	
Albany <i>a</i>	219.91	1892	.....	20	1:62,500
Albany and vicinity <i>a</i>	<i>*877.91</i>	1892	.....	20	1:62,500
Albion.....	218.16	1896	.....	20	1:62,500
Alexandria Bay.....	134.26	1900	.....	20	1:62,500
Amsterdam.....	219.04	1893	.....	20	1:62,500
Angelica.....	220.78	1904	.....	20	1:62,500
Apalachin <i>b</i>	221.65	1901	.....	20	1:62,500
Attica.....	219.04	1904	.....	20	1:62,500
Auburn.....	219.04	1896	.....	20	1:62,500
Ausable <i>m</i>	213.72	1893	.....	20	1:62,500
Babylon <i>b</i>	125.00	1901	.....	20	1:62,500
Baldwinsville.....	218.16	1898	.....	20	1:62,500
Batavia.....	219.04	1902	.....	20	1:62,500
Berlin (N. Y.-Mass.-Vt.) <i>c</i>	167.25	1888	.....	20	1:62,500
Berne.....	219.91	1900	.....	20	1:62,500
Big Moose.....	215.51	1901	.....	20	1:62,500
Binghamton.....	221.65	1901	.....	20	1:62,500
Blue Mountain.....	215.51	1900	.....	20	1:62,500
Bolton.....	216.40	1895	.....	20	1:62,500
Boonville.....	217.28	1901	.....	20	1:62,500
Brier Hill.....	100.00	1904	1906	20	1:62,500
Broadalbin.....	218.16	1899	.....	20	1:62,500
Brockport.....	218.16	1897	.....	20	1:62,500
Brooklyn <i>d</i>	171.00	1889	1897	20	1:62,500
Buffalo (N. Y.-Canada) <i>e</i>	140.61	1893	1900	20	1:62,500
Caledonia.....	219.04	1902	.....	20	1:62,500
Cambridge (N. Y.-Vt.) <i>f</i>	206.40	1893	.....	20	1:62,500
Canajoharie.....	219.04	1898	.....	20	1:62,500
Canandaigua.....	219.04	1900	.....	20	1:62,500
Cape Vincent (N. Y.-Can.).....	72.66	1893	.....	20	1:62,500
Caratonk <i>h</i>	<i>*884.85</i>	1901	.....	40	1:125,000

a Albany and vicinity sheet includes Albany, Cohoes, Schenectady and Troy sheets.

b Babylon, Fire Island, Northport, and Setauket sheets, on scale of 1:62,500, have been reduced and form Islip sheet, on scale of 1:125,000.

c Berlin and Hoosic sheets, on scale of 1:62,500, have been reduced and form parts of Taconic sheet, on scale of 1:125,000.

d New York City and vicinity sheet includes Brooklyn, Harlem, Paterson, Staten Island and parts of Hempstead, Oyster Bay and Sandy Hook sheets.

e Niagara River and vicinity includes parts of Buffalo, Niagara Falls and Tonawanda sheets.

f Cambridge, Fort Ann, and Pawlet sheets, on scale of 1:62,500, have been reduced and form parts of Mettawee sheet, on scale of 1:125,000.

h Caratonk sheet, on scale of 1:125,000, is composed of Apalachin, Dryden, Harford, and Owego sheets, on scale of 1:62,500.

m Mt. Marcy and vicinity sheet includes Ausable, Elizabethtown, Lake Placid and Mt. Marcy sheets, on scales of 1:62,500.

* Figures in *italic* are not included in total, as the sheets form parts of others whose total areas are given.

Topographic surveys in New York, by quadrangles, to December 31, 1906 — (Continued).

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK—(Continued)	<i>Sq. miles.</i>			<i>Feet.</i>	
Carmel (N. Y.-Conn.)	187.89	1890		20	1:62,500
Carthage	215.51	1902		20	1:62,500
Castleton (Vt.-N. Y.)	.99	1895	1898	20	1:62,500
Catskill	221.65	1893		20	1:62,500
Cazenovia	219.04	1897		20	1:62,500
Chautauqua	221.65	1902		20	1:62,500
Cherry Creek	220.78	1898		20	1:62,500
Chittenango	218.16	1893		20	1:62,500
Clayton	202.35	1900		20	1:62,500
Clove (N. Y.-Conn.)	203.47	1891		20	1:62,500
Clyde	218.16	1899		20	1:62,500
Clymer	221.65	1903		20	1:62,500
Cohoes a	219.04	1892		20	1:62,500
Copake (N. Y.-Mass.)	220.87	1902		20	1:62,500
Cornwall (Conn.-N. Y.) i	1.82	1890		20	1:62,500
Cortland	219.91	1901		20	1:62,500
Coxsackie	220.78	1892		20	1:62,500
Depew	219.04	1904		20	1:62,500
Dryden h	220.78	1898		20	1:62,500
Dunkirk	190.77	1898		20	1:62,500
Durham	220.78	1892		20	1:62,500
Easthampton	28.00	1903		20	1:62,500
Eden	211.41	1905		20	1:62,500
Elizabethtown m	214.61	1892		20	1:62,500
Ellenville	223.36	1904		20	1:62,500
Elmira (N. Y.-Pa.) j	220.10	1893		20	1:62,500
Fire Island b	85.00	1902		20	1:62,500
Fonda	219.04	1894		20	1:62,500
Fort Ann (N. Y.-Vt.) c	214.28	1893	1901	20	1:62,500
Fulton l	232.80	1898		20	1:62,500
Gaines (Pa.-N. Y.)	.20	1899		20	1:62,500
Gardiners Island	43.00	1903		20	1:62,500
Geneva	219.04	1899		20	1:62,500
Genoa	219.91	1899		20	1:62,500
Gilboa	220.78	1901		20	1:62,500

a Albany and vicinity includes Albany, Cohoes, Schenectady and Troy sheets.

b Babylon, Fire Island, Northport and Setauket sheets, on scale of 1:62,500, have been reduced and form Islip sheet, on scale of 1:125,000.

c Cambridge, Fort Ann and Pawlet sheets, on scale of 1:62,500, have been reduced and form parts of Metawee sheet, on scale of 1:125,000.

h Caratunk sheet, on scale of 1:125,000, is composed of Apalachin, Dryden, Harford and Oswego, on scale of 1:62,500.

i Cornwall (Conn.-N. Y.) sheet, on scale of 1:62,500, has been reduced, and forms part of Litchfield, Conn. sheet, on scale of 1:125,000.

j Elmira (N. Y.-Pa.), Ithaca, Watkins and Waverly sheets, on scale of 1:62,500, have been reduced and form parts of Watkins Glen (N. Y.-Pa.) sheet, on scale of 1:125,000.

l Oswego special sheet, is formed by parts of Fulton and Oswego sheets, on scale of 1:62,500.

m Mt. Marcy and vicinity sheet includes Ausable, Elizabethtown, Lake Placid, and Mt. Marcy sheets, on scale of 1:62,500.

*Topographic surveys in New York, by quadrangles, to December
31, 1906 — (Continued).*

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK—(Continued)	<i>Sq. miles</i>			<i>Feet.</i>	
Glens Falls.....	217.28	1895	.....	20	1:62,500
Gloversville.....	218.16	1901	.....	20	1:62,500
Goshen (N. Y.-N. J.).....	223.01	1906	.....	20	1:62,500
Greene.....	220.78	1902	.....	20	1:62,500
Greenwood Lake (N. J.-N. Y.).....	39.20	1888	.....	20	1:62,500
Grindstone.....	23.60	1900	.....	20	1:62,500
Hamlin.....	87.00	1897	.....	20	1:62,500
Hammondsport.....	220.78	1900	.....	20	1:62,500
Harford <i>h</i>	220.78	1901	.....	20	1:62,500
Harlem (N. Y.-N. J.) <i>a</i>	178.86	1889	1897	20	1:62,500
Hempstead <i>a</i>	145.00	1897	.....	20	1:62,500
Highmarket.....	216.40	1904	.....	20	1:62,500
Hobart.....	220.78	1902	.....	20	1:62,500
Honeoye.....	219.04	1901	.....	20	1:62,500
Hoosic (N. Y.-Vt.) <i>b</i>	193.47	1894	.....	20	1:62,500
Housatonic (Mass.-N. Y.-Conn.) <i>c</i>	<i>*99.87</i>	1888	.....	40	1:125,000
Indian Lake.....	216.40	1897	.....	20	1:62,500
Islip <i>d</i>	<i>*665.90</i>	1902	.....	20	1:125,000
Ithaca.....	220.78	1893	.....	20	1:62,500
Jamestown.....	221.65	1903	.....	20	1:62,500
Kaaterskill.....	221.65	1892	.....	20	1:62,500
Kasong.....	217.28	1904	.....	20	1:62,500
Kinderhook.....	220.78	1900	.....	20	1:62,500
Lake Placid <i>m</i>	213.72	1894	.....	20	1:62,500
Lake Pleasant.....	217.28	1904	.....	20	1:62,500
Lassellville.....	218.16	1901	.....	20	1:62,500
Litchfield (Conn.-N. Y.) <i>i</i>	<i>*1.82</i>	1890	.....	40	1:125,000
Little Falls.....	218.16	1898	.....	20	1:62,500
Lockport <i>e</i>	218.16	1896	.....	20	1:62,500
Long Lake.....	214.61	1902	.....	20	1:62,500
Loon Lake.....	212.82	1906	.....	20	1:62,500
Luzerne.....	217.28	1900	.....	20	1:62,500
Macedon.....	236.86	1898	.....	20	1:62,500
Margaretville.....	221.65	1901	.....	20	1:62,500

a New York City and vicinity sheet includes Brooklyn, Harlem, Patterson, Staten Island and parts of Hempstead Oyster Bay, and Sandy Hook sheets.

b Berlin and Hoosic sheets, on scale of 1:62,500, have been reduced and form parts of Taconic sheet, on scale of 1:125,000.

c Pittsfield and Sheffield sheets, on scale of 1:62,500, have been reduced and form parts of Housatonic sheet, on scale of 1:125,000.

d Babylon, Fire Island, Northport, and Setauket sheets, on scale of 1:62,500, have been reduced and form Islip sheet, on scale of 1:125,000.

e Lockport, Niagara Falls, Olcott, Tonawanda and Wilson sheets, on scale of 1:62,500, have been reduced and form parts of Niagara sheet, on scale of 1:125,000.

f Caratunk sheet, on scale of 1:125,000, is composed of Apalachin, Dryden, Harford and Owego, on scale of 1:62,500.

g Cornwall (Conn.-N. Y.) sheet, on scale of 1:62,500, has been reduced and forms part of Litchfield (Conn.-N. Y.) sheet, on scale of 1:125,000.

h Elmira (N. Y.-Pa.), Ithaca, Watkins and Waverly sheets, on scale of 1:62,500, have been reduced and form parts of Watkins (N. Y.-Pa.) sheet, on scale of 1:125,000.

m Mt. Marcy and vicinity sheet includes Ausable, Elizabethtown, Lake Placid and Mt. Marcy sheets, on scale of 1:62,500.

*Figures in italic are not included in total, as the sheets form parts of others whose total areas are given.

Topographic surveys in New York, by quadrangles, to December 31, 1906 — (Continued).

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK—(Continued)	<i>Sq. miles.</i>			<i>Feet.</i>	
Massena.....	209.00	1904	1906	20	1:62,500
Medina.....	218.16	1896	.....	20	1:62,500
Mettawee (N. Y.-Vt.) <i>a</i>	<i>*480.88</i>	1894	.....	40	1:125,000
Mexico.....	217.28	1904	.....	20	1:62,500
Millbrook (N. Y.-Conn.).....	219.50	1899	.....	20	1:62,500
Moravia.....	219.91	1896	.....	20	1:62,500
Moriches.....	203.00	1903	.....	20	1:62,500
Morrisville.....	219.04	1899	.....	20	1:62,500
Montauk.....	19.00	1903	.....	20	1:62,500
Mooers.....	216.21	1893	.....	20	1:62,500
Mount Marcy <i>m</i>	214.61	1892	.....	20	1:62,500
Mount Marcy and Vicinity <i>m</i>.....	.....	1894	.....	20	1:62,500
Naples.....	219.91	1900	.....	20	1:62,500
Navesink (N. Y.-N. J.) <i>b</i>	<i>*.60</i>	1885	.....	20	1:125,000
New Brunswick (N. J.-N. Y.) <i>b</i>.....	.30	1885	.....	10	1:62,500
Newburg.....	223.36	1900	.....	20	1:62,500
Newcomb.....	215.51	1896	.....	20	1:62,500
New London (Conn.-N. Y.).....	0.33	1890	.....	20	1:62,500
New York City and vicinity (N. Y.-N. J.) <i>c</i>.....	.....	1899	.....	20	1:62,500
Niagara <i>d</i>	<i>*578.71</i>	1896	.....	20	1:125,000
Niagara Falls (N. Y.-Can.) <i>d e f</i>	43.49	1893	.....	20	1:62,500
Niagara Falls and vicinity <i>d e</i>.....	.....	1900	.....	20	1:62,500
Niagara River and vicinity <i>f</i>.....	.....	1900	.....	20	1:62,500
Nineveh.....	221.65	1903	.....	20	1:62,500
North Creek.....	216.40	1895	.....	20	1:62,500
Northport <i>g</i>	170.00	1901	.....	20	1:62,500
Norwalk (Conn.-N. Y.).....	.91	1890	.....	20	1:62,500

a Cambridge, Fort Ann and Pawlet sheets, on scale of 1:62,500, have been reduced and form parts of Mettawee sheet, on scale of 1:125,000.

b New Brunswick and Sandy Hook sheets, on scale of 1:62,500, have been reduced and form parts of Navesink sheet, on scale of 1:125,000.

c New York City and vicinity sheet includes Brooklyn, Harlem, Paterson, Staten Island and parts of Hempstead, Oyster Bay and Sandy Hook sheets.

d Lockport, Niagara Falls, Olcott, Tonawanda, and Wilson sheets, on scale of 1:62,500, have been reduced and form parts of Niagara sheet, on scale of 1:125,000.

e Niagara Falls and vicinity sheet includes Niagara Falls, Tonawanda, and Wilson sheets.

f Niagara River and vicinity sheet includes parts of Buffalo, Niagara Falls and Tonawanda sheets.

g Babylon, Fire Island, Northport, and Setauket sheets, on scale of 1:62,500, have been reduced and form Islip sheet, on scale of 1:125,000.

m Mt. Marcy and vicinity sheet includes Ausable, Elizabethtown, Lake Placid and Mt. Marcy sheets, on scale of 1:62,500.

* Figures in *italic* are not included in total, as the sheets form parts of others whose total are given.

Topographic surveys in New York, by quadrangles, to December 31, 1906 — (Continued).

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK—(Continued)	<i>Sq. miles.</i>			<i>Feet.</i>	
Norwich.....	219.91	1900	.....	20	1:62,500
Nunda.....	219.91	1903	.....	20	1:62,500
Oak Orchard.....	106.00	1896	.....	20	1:62,500
Ogdensburg.....	206.00	1904	.....	20	1:62,500
Olcott <i>a</i>	92.90	1896	.....	20	1:62,500
Old Forge.....	216.40	1897	1898	20	1:62,500
Olean (N. Y.-Pa.).....	221.35	1896	.....	20	1:62,500
Oneida.....	218.16	1893	.....	20	1:62,500
Ontario Beach <i>k</i>	25.50	1894	.....	20	1:62,500
Oriskany.....	218.16	1893	.....	20	1:62,500
Orwell.....	216.40	1903	.....	20	1:62,500
Oswego <i>l</i>	139.80	1898	.....	20	1:62,500
Oswego Special <i>l</i>.....	.....	1898	.....	20	1:62,500
Ovid.....	219.91	1899	.....	20	1:62,500
Owego (N. Y.-Pa.) <i>h</i>	221.65	1900	.....	20	1:62,500
Oxford.....	220.78	1902	.....	20	1:62,500
Oyster Bay (N. Y.-Conn.) <i>b</i>	157.08	1897	.....	20	1:62,500
Palmira.....	218.16	1899	.....	20	1:62,500
Paradox Lake.....	215.51	1895	.....	20	1:62,500
Passaic (N. J.-N. Y.) <i>c</i>	<i>*99.68</i>	1897	.....	20	1:125,000
Paterson (N. J.-N. Y.) <i>b c</i>	1.60	1889	1897	20	1:62,500
Pawlet (Vt.-N. Y.) <i>d</i>.....	.18	1894	1898	20	1:62,500
Penn Yan.....	219.91	1900	.....	20	1:62,500
Phelps.....	219.04	1899	.....	20	1:62,500
Phoenicia.....	221.65	1900	.....	20	1:62,500
Piseco Lake.....	217.28	1904	.....	20	1:62,500
Pitcher.....	219.91	1901	.....	20	1:62,500
Pittsfield (Mass.-N. Y.) <i>e</i>	85.27	1888	.....	20	1:62,500
Plainfield (N. J.-N. Y.).....	.56	1887	1899	20	1:62,500
Plattsburg (N. Y.-Vt.).....	110.00	1893	.....	20	1:62,500
Portage.....	219.91	1903	.....	20	1:62,500
Port Henry (N. Y.-Vt.).....	90.40	1892	.....	20	1:62,500
Port Jervis (N. Y.-N. J.-Pa.).....	151.40	1906	.....	20	1:62,500
Port Leyden.....	216.40	1905	.....	20	1:62,500
Potsdam.....	212.82	1906	.....	20	1:62,500
Poughkeepsie.....	223.36	1892	.....	20	1:62,500

a Lockport, Niagara Falls, Olcott, Tonawanda and Wilson sheets, on scale of 1:62,500 have been reduced and form parts of Niagara sheet, on scale of 1:125,000.

b New York City and vicinity sheet includes Brooklyn, Harlem, Paterson, Staten Island and parts of Hempstead, Oyster Bay and Sandy Hook sheets.

c Paterson and Staten Island sheets, on scale of 1:62,500, have been reduced and form parts of Passaic sheet, on scale of 1:125,000.

d Cambridge, Fort Ann and Pawlet sheets, on scale of 1:62,500, have been reduced and form parts of Mettawee sheet, on scale of 1:125,000.

e Pittsfield and Sheffield sheets, on scale of 1:62,500, have been reduced and form parts of Housatonic sheet, on scale of 1:125,000.

h Caratunk sheet, on scale of 1:125,000, is composed of Apalachin, Dryden, Harford and Owego sheets, on scale of 1:62,500.

k Rochester special sheet includes Rochester and Ontario Beach, on scale of 1:62,500.

l Oswego special sheet, is formed by parts of Fulton and Oswego sheets, on scale of 1:62,500.

* Figures in italic are not included in total, as the sheets form parts of others whose total areas are given.

Topographic surveys in New York, by quadrangles, to December 31, 1906 — (Continued).

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
New York—(Continued)	Sq. miles.			Feet.	
Pulaski.....	178.00	1893	.....	20	1:62,500
Pultneyville.....	29.00	1898	.....	20	1:62,500
Ramapo (N. J.-N. Y.).....	136.40	1888	.....	20	1:62,500
Raquette Lake.....	215.51	1899	.....	20	1:62,500
Red Mills.....	36.00	1904	.....	20	1:62,500
Remsen.....	217.28	1897	.....	20	1:62,500
Rhinebeck.....	222.50	1894	.....	20	1:62,500
Richfield Springs.....	219.04	1900	.....	20	1:62,500
Richmondville.....	219.91	1902	.....	20	1:62,500
Ridgeway.....	110.00	1896	.....	20	1:62,500
Riverhead.....	147.00	1903	.....	20	1:62,500
Rochester <i>k</i>	218.16	1893	.....	20	1:62,500
Rochester special <i>k</i>		1893	.....	20	1:62,500
Rosendale.....	222.50	1901	.....	20	1:62,500
Rouse Point (N. Y.-Vt.).....	124.01	1893	.....	20	1:62,500
Sacketts Harbor.....	180.00	1893	.....	20	1:62,500
Sag Harbor.....	82.00	1903	.....	20	1:62,500
Salamanca (N. Y.-Pa.).....	221.50	1897	.....	20	1:62,500
Sandy Hook <i>a b</i>	20	1884	.....	10	1:62,500
Sangerfield.....	219.04	1905	.....	20	1:62,500
Santanoni.....	214.61	1901	.....	20	1:62,500
Saranac.....	213.72	1902	.....	20	1:62,500
Saratoga.....	218.16	1899	.....	20	1:62,500
Schenectady <i>c</i>	219.04	1892	.....	20	1:62,500
Schoharie.....	219.91	1898	.....	20	1:62,500
Schroon Lake.....	215.51	1895	.....	20	1:62,500
Schunemunk.....	224.21	1899	.....	20	1:62,500
Schuylerville.....	218.16	1898	.....	20	1:62,500
Setauket <i>d</i>	185.90	1902	.....	20	1:62,500
Sheffield (Mass.-Conn.-N. Y.) <i>e</i>	14.40	1885	.....	20	1:62,500
Shelter Island.....	62.00	1903	.....	20	1:62,500
Silver Creek.....	72.00	1898	.....	20	1:62,500

a New York City and vicinity sheet includes Brooklyn, Harlem, Paterson, Staten Island and parts of Hempstead, Oyster Bay and Sandy Hook sheets.

b New Brunswick and Sandy Hook sheets, on scale of 1:62,500, have been reduced and form parts of Navesink sheet, on scale of 1:125,000.

c Albany and vicinity sheet includes Albany, Cohoes, Schenectady and Troy sheets.

d Babylon, Fire Island, Northport and Setauket sheets, on scale of 1:62,500, have been reduced and form Islip sheet, on scale of 1:125,000.

e Pittsfield and Sheffield sheets, on scale of 1:62,500, have been reduced and form parts of Hoosatic sheet, on scale of 1:125,000.

k Rochester special sheet, on scale of 1:62,500, includes Rochester and Ontario Beach sheets, on scale of 1:62,500.

Topographic surveys in New York, by quadrangles, to December 31, 1906 — (Concluded).

STATE AND QUADRANGLE.	Area mapped.	YEAR.		Contour interval.	Scale.
		Original survey.	Resurvey or revision.		
NEW YORK—(Concluded)	<i>Sq. miles.</i>			<i>Feet.</i>	
Skaneateles.....	219.04	1896	.....	20	1:62,500
Slide Mountain.....	222.50	1903	.....	20	1:62,500
Sodus Bay.....	35.69	1899	.....	20	1:62,500
St. Regis.....	213.72	1903	.....	20	1:62,500
Stamford (Conn.-N. Y.).....	112.95	1890	.....	20	1:62,550
Staten Island (N. J.-N. Y.) <i>a b</i>	97.47	1889	1897	20	1:62,000
Stonington (Conn.-R. I.-N. Y.).....	4.50	1888	.....	20	1:62,500
Stony Island.....	29.00	1893	.....	20	1:62,500
Syracuse.....	218.16	1893	.....	20	1:62,500
Taberg.....	217.28	1903	.....	20	1:62,500
Taconic (N. Y.-Mass.-Vt.) <i>c</i>	<i>*380.72</i>	1896	.....	40	1:125,000
Tarrytown (N. Y.-N. J.).....	218.36	1890	.....	20	1:62,500
Theresa.....	214.61	1900	.....	20	1:62,500
Thirteenth Lake.....	216.40	1896	.....	20	1:62,500
Ticonderoga (N. Y.-Vt.).....	94.50	1894	.....	20	1:62,500
Tonawanda <i>d e f</i>	218.16	1893	.....	20	1:62,500
Troy <i>g</i>	219.91	1891	.....	20	1:62,500
Tully.....	219.04	1897	.....	20	1:62,500
Tupper Lake.....	214.61	1904	.....	20	1:62,500
Utica.....	218.16	1896	.....	20	1:62,500
Waddington.....	136.00	1904	.....	20	1:62,500
Watertown.....	215.51	1893	.....	20	1:62,500
Watkins <i>j</i>	220.78	1898	.....	20	1:62,500
Watkins Glen (N. Y.-Pa.) <i>j</i>	<i>*883.10</i>	1899	.....	40	1:125,000
Waverly <i>j</i>	221.45	1899	.....	20	1:62,500
Wayland.....	219.91	1902	.....	20	1:62,500
Weedsport.....	218.16	1899	.....	20	1:62,500
West Canada Lakes.....	216.40	1898	.....	20	1:62,500
Westfield.....	73.00	1898	.....	20	1:62,500
West Point.....	224.21	1891	.....	20	1:62,500
Whitehall (N. Y.-Vt.).....	151.00	1893	1901	20	1:62,500
Willsboro (N. Y.-Vt.).....	157.02	1893	.....	20	1:62,500
Wilmurt.....	217.28	1893	.....	20	1:62,500
Wilson <i>d e</i>	50.80	1898	.....	20	1:62,500
Winfield.....	219.04	1905	.....	20	1:62,500
Total, New York.....	38,148.55				

a New York City and vicinity sheet includes Brooklyn, Harlem, Paterson, Staten Island and parts of Hempstead, Oyster Bay and Sandy Hook sheets.

b Paterson and Staten Island sheets, on scale of 1:62,500, have been reduced and form parts of Passaic sheet, on scale of 1:125,000.

c Berlin and Hoosic sheets on scale of 1:62,500 have been reduced and form parts of Taconic sheet, on scale of 1:125,000.

d Lockport, Niagara Falls, Olcott, Tonawanda and Wilson sheets, on scale of 1:62,500, have been reduced and form parts of Niagara, on scale of 1:125,000.

e Niagara Falls and vicinity sheet includes Niagara Falls, Tonawanda and Wilson sheets.

f Niagara River and vicinity sheet includes parts of Buffalo, Niagara Falls and Tonawanda sheets.

g Albany and vicinity sheet includes Albany, Cohoes, Schenectady and Troy sheets.

j Elmira (N. Y.-Pa.), Ithaca, Watkins and Waverly sheets, on scale of 1:62,500, have been reduced and form parts of Watkins Glen (N. Y.-Pa.) sheet, on scale of 1:125,000.

* Figures in italic are not included in total, as the sheets form parts of others whose total areas are given.

REPORT

OF THE

EXAMINATION

OF THE

NEW YORK-PENNSYLVANIA BOUNDARY LINE.

1906.

New York-Pennsylvania Boundary Line.

REPORT OF EXAMINATION OF LINE AND REPLACEMENT OF MONUMENTS.

HARRISBURG, PA., *December 31, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor of
the State of New York, Albany, N. Y.:*

MAJOR ISAAC B. BROWN, *Secretary of Internal Affairs of the
Commonwealth of Pennsylvania, Harrisburg, Pa.:*

Gentlemen.— In pursuance of your instructions dated July 20, 1906, we respectfully submit the following as our report of the examination of the boundary line monuments between the States of New York and Pennsylvania, and of the replacing, resetting and repairing of such monuments, as in our opinion should be replaced, reset or repaired.

On the 6th day of August, 1906, we commenced the examination and continued until completed. The first monument is a highway stone, located on the south bank of the Delaware river, near Hale's Eddy. Our investigations continued westerly to the southwest corner of the State of New York, and thence northerly to the northwest corner of said state. The last monument is located on the south shore of Lake Erie, and is termed the "Bluff Monument."

In considering this report of the examination, it is understood that some references are made to the explanations given in the report of the Commissioners of 1903, who were appointed by the Commonwealth of Pennsylvania to examine said boundary line. In our descriptions of monuments, we have mentioned in each case the number of inches the top of the monument or stone extends above the surface of the ground, the size of the monument or stone, and the inscriptions on the same, with an account of its condition.

The monuments between Nos. 391 and 415, inclusive, which are located between Tuna Valley and Corydon, known as the wilderness, were not visited by us. The examination for the year 1903 reported the monuments as in good condition. We made an effort to go over this portion of the line, and found it would be necessary to have a surveyor, with transit, and axmen.

The whole country is thickly overgrown with briars, alders and berry bushes of great height, and the ground nearly covered with old dead tree tops. There are no indications of the line by blazed trees. As we understood, our instructions did not give us authority to incur such an expense. We passed around that portion of the line, and so report.

Representatives of railroads are careless in allowing the monuments to be buried in the railroad embankments. Highway commissioners allow the earth to be scraped away from the highway monuments without any just cause.

The Erie R. R. Co. is building a new road on the east side of the Little Brokenstraw creek, between Monuments Nos. 474 and 475.

The following monuments were reset: Nos. 15, 19, 38, 47, 68, 73, 91, 92, 95, 106, 121, 180, 196, 226, 228, 254, 270, 272, 289, 300, 333, 365, 372, 443, 453, 484, 511 and 512.

The following were repaired: Nos. 109, 186, 197, 229, 265, 271 and 373.

Monuments Nos. 8 and 33, located on the Meridian boundary line, should be reset.

Monuments marking this line are divided into six classes.

FIRST CLASS — HIGHWAY MONUMENTS.

These are placed at highways intersecting or following the boundary line. Mile-stones placed alongside highways are of this class. These monuments are four and one-half feet long; the top is dressed rectangular, twelve inches by six inches; at right angles across the center, parallel with the edges, are cut two quarter-inch grooves; the upper end of each side to the depth of twelve inches is also dressed, and upon broad (north) face is cut the letters "N. Y." and upon the other (south) the letters "Pa." The mile-stones of this class are further marked with the number

of the original mile monument and the letter "M." These monuments weigh from 375 to 500 pounds. In setting monuments of this class, the longer groove was placed in the direction of the boundary.

SECOND, THIRD AND FOURTH CLASSES.

Monuments of the second, third and fourth classes are four feet long, the top is dressed six inches square, and the upper end of each side is also dressed to the depth of six inches. These monuments weigh from 170 to 220 pounds.

Monuments of the second class are placed at the original mile points, which are not marked by monuments of the first or fourth classes. Across the top at right angles and parallel with the faces, are cut two quarter-inch grooves; on opposite faces are cut the letters "N. Y." (north) and "Pa." (south), and upon a third (east) face, the number of the original monument, with the letter "M." under it.

Monuments of the third class are similar in all respects to monuments of the second class, with the exception that the number upon the third face is omitted, except in a few instances. They are placed at railway and river intersections and at such other points as were deemed necessary. Monuments of the second and third classes are set so that the faces containing the letters "N. Y." and "Pa." are parallel with the boundary.

Monuments of the fourth class have cut diagonally across their top two quarter-inch grooves, and they are set so that one of the diagonal grooves is in the direction of the boundary. The faces are especially lettered. These monuments are generally mile-stones, marking the town or county corners; the face of the stone toward the town or county is marked with the initial letter of the name.

FIFTH CLASS.

Monuments of this class are placed to mark the astronomical stations of the United States Coast and Geodetic Survey, occupied in 1877 and 1879. Each monument is a block of granite of the general dimensions of twelve inches square and eighteen inches or more deep. The top is dressed and the station point is marked upon it in the center by a cross (X). Upon the top are also cut

the name of the station, the letters "U. S. C. and G. S." and the year in which the station was occupied. The monuments of this class were not examined, as they are all buried beneath the surface.

SIXTH CLASS.

These monuments are made from a 5-foot section of a 5-inch by 3-inch I-beam, on the bottom of which is bolted a plate whose dimension are $\frac{1}{4}$ x 8 x 10 inches. On the north and south faces of the monument are riveted two nickel plates bearing the words "New York" and "Pennsylvania."

DETAILED REPORT OF EXAMINATION OF BOUNDARY LINE MONUMENTS BETWEEN THE STATES OF NEW YORK AND PENNSYLVANIA, MADE IN AUGUST, SEPTEMBER, OCTOBER AND NOVEMBER, 1906.

Monument No. 1.

Made of granite, 12 x 6 inches; stands 12 inches above the surface of the ground. On south side are the letters "Pa."; on north side "N. Y." In good condition. Located on south side of road leading from Hale Eddy to Lanesborough, on south bank of Delaware river, four paces east of Initial Monument, and on line between properties of Elias Mereness and Day Turrell.

Monument No. 2. Initial Monument.

A shaft of Rhode Island granite, polished on the Pennsylvania and New York sides, east and west sides not polished. Size 6 feet high, base 12 x 24 inches. Shaft 5 feet high and 12 x 20 inches. The south or Pennsylvania side bears the following inscription:

" Pennsylvania
James Worrall
Christopher M. Gere
Robert N. Torrey
Commissioners
600 ft. west of the N. E. corner of Penna.
C. M. Gere
Surveyor."

The New York side bears the following inscription:

“ New York
Boundary
Monument
1884
Henry R. Pierson
Elias W. Leavenworth
Chauncey M. Depew
Commissioners
600 ft. west of the N. E. corner of
Pennsylvania
H. W. Clark
Surveyor.”

Monument No. 3. Mile-stone No. 1.

Made of granite, 12 x 6 inches, stands 12 inches above surface of ground. On the south side are the letters “Pa.”; on north side “N. Y.”; east side “1. M.”, and is in good condition. To find this monument take road leading up the hill at west end of bridge, go to second pair of bars; then east 10 paces to monument. Has diagonal grooves on top of stone. On property of H. Olds.

Monument No. 4. Mile-stone No. 2.

Made of granite, 9 inches above surface of ground. On south side are the letters “Pa.”; on the north side “N. Y.” No inscription of miles on this stone. Stands on level ground two paces from Cayuga lake brook on west bank, at east end of wire fence in the open field, nearly in line between maple tree on opposite side of stream, and large barn which stands on road to Lanesborough or Sherman. In good condition. Stands on line between Sidney Alexander and Mrs. D. Alexander, and at east end of line wire fence.

Monument No. 5. Highway Stone No. 1.

Made of granite, 12 x 6 inches; stands 12 inches above surface of ground. In good condition. On the south side are the letters “Pa.”; on north side “N. Y.” Stands on west side of road leading from Hale Eddy to Lanesborough, about 100 feet north

of forks of road and opposite large barn. On line between Sidney Alexander and Mrs. D. Alexander.

Monument No. 6. Mile-stone No. 3.

Made of granite, 6 x 6 inches, 8 inches above surface of ground. On south side are letters "Pa."; on north side "N. Y."; east side "3 M." In good condition. Stands in cleared field on south edge of second growth timber, 12 feet east of bars, sixty-four paces west of a tall ash tree on State Line, and stone in line of wire fence. To find this monument turn from road leading from Hale Eddy to Lanesborough about 800 feet south of a woolen mill in the village of Sherman, thence along a creek by a good road on the left bank to Monument No. 7, thence east through fields to house of E. A. Bronson, and thence through ravine to top of steep hill, and find location of stone on steep southerly slope. On line between A. Carrow and E. A. Bronson.

Monument No. 7. Mile-stone No. 4.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "4. M." Southeast corner chipped; otherwise in good condition. Stands on north side of road leading from Sherman to Oquaga Lake, at east end of line fence on bank about 3 feet higher than road bed and thirty paces east from twin maples on line. This stone serves as the fourth mile-stone, as well as Highway Stone No. 1. On property of William Gordner and Frank Latell.

Monument No. 8. Mile-stone No. 5.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "5 M." In good condition. Stands in open field sixty paces northeast of white ash tree, about 20 feet southwest from a big boulder on easterly slope in stony land, about 1,300 feet southwest from an old barn, about 100 feet due west of quite a large maple tree; a few scattering small maples are about 150 feet west of monument. To find this monument go due north from Wayne Lee's house. On property of Wayne Lee.

Monument No. 9. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Northeast corner badly chipped; otherwise in good condition. Stands on west side of road leading from Sherman to Danville, about 800 feet south of Talmadge House. On property of John Lake and Harvey Kelsey.

Monument No. 10. Mile-stone No. 6.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "6 M." In good condition. Stands 165 feet east of Monument No. 11, in a growth of small trees at foot of hill, sloping east, brush on south side, cleared field on north side, and surrounded by a good sized stone pile. On line between F. S. Merrick and Henry Arnicke.

Monument No. 11. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Southeast and southwest corners chipped; otherwise in good condition. Stands on west side of road leading from Danville to Stevens Point, at the foot of a steep hill, 104 paces south of forks of road. On line between F. S. Merrick, and John Hemingway.

Monument No. 12. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. On the south side are the letters "Pa."; on north side "N. Y." Southeast corner chipped; otherwise in good condition. Stands on top of hill at south side of boundary line road leading from Stevens Point to Danville. On line between F. S. Merrick and John Hemingway.

Monument No. 13. Highway Stone No. 3. County Corner Stone No. 1.

Made of granite, 12 x 6 inches, 18 inches above surface of ground. On the south side are the letters "Pa."; below these on the east side of the south face is the letter "W."; on west side of

south face are the letters "S. Co."; on north side "N. Y." Stands on south side of boundary line road, in corner of rail fence near track of road. This stone marks the corners of Susquehanna and Wayne counties in Pennsylvania. Road turns to southwest at this point. On line between the property of Alexander and Hemingway and H. Decker.

Monument No. 14. Mile-stone No. 7.

Made of granite, 6 x 6 inches, 8 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "7 M." Northwest corner chipped; otherwise in good condition. Stands at the foot of a steep easterly slope, in line wire fence, twenty-four paces east of a wire fence running north and south; about 35 feet south of three black cherry trees, and 1,692 feet east of Monument No. 15. On line between property of Wm. Seamens and the Bishop estate.

Monument No. 15. Highway Stone No. 1.

Made of granite, 12 x 6 inches. This monument had heaved 8 inches, and we reset its top 10 inches above surface of ground; in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Deep Hollow road. On property of Elias Decker.

Monument No. 16. Mile-stone No. 8.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "8 M." In good condition. Stands about 840 feet west of Geo. Kuhn's old house (not occupied), two large boulders just a little north of west of stone, the first about 40 feet, and the second about 60 feet. Five paces south of three small boulders, on a westerly slope, in edge of old tumbled-down stone fence. On line between G. P. Kuhn and Mr. Kesler.

Monument No. 17. Mile-stone No. 9.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north "N. Y."; on east side "9 M." Stands in a thick briar patch, 42 paces south of the

westerly of two large maple trees, the southerly tree having been struck by lightning, and being dead. Following the road back of one O'Day's house, through woods into cleared fields, thence through a strip of meadow land to the two large maples which stand in a burnt district, now grown up to briars, and very stony. On line between W. H. O'Day and Mumford. Very hard to find.

Monument No. 18. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Southeast corner chipped; otherwise in good condition. Stands on east side of road known as Pig Pen Run, not much traveled, 250 paces north of Aldrich's house. On line between H. Aldrich and Lill Smith.

Monument No. 19. Town Stone No. 1.

Made of granite, 6 x 6 inches. Was 20 inches above ground, and we reset its top 10 inches above ground, in good condition. On southwest side are the letters "Pa."; on northwest side the letter "W."; northeast side "S.", and has diagonal grooves marking corners of the towns of Sanford and Windsor, in Broome county, N. Y. Stands in cleared field; underbrush and stone wall fence on north side of stone; is about 440 feet east of Monument No. 20. On line between P. F. O'Rourke and H. Aldrich.

Monument No. 20. Mile-stone No. 10.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "10 M." In good condition. Stands in line of wire fence, 152 paces east of Monument No. 21. On south side are cleared fields, on north side, heavy underbrush. It is about 40 feet south of a large burnt stump which stands in clearing. On line between H. Aldrich and O. W. Patrick.

Monument No. 21. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." In good condition. On south side, dense thicket; on north side,

cleared field; 605 feet west of Monument No. 20, and 50 feet west of an old road not much used, thus making the stone of little use as a highway stone. On line between Henry Aldrich and O. W. Patrick.

Monument No. 22. Mile-stone No. 11.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "11 M." In good condition. Stands about 1,356 feet east of Monument No. 23, 28 paces east of a maple tree on line, and 7 paces north of a beech tree, which is about 10 inches in diameter. In second growth woods. On line between Mrs. Grimm and Frank Plunket.

Monument No. 23. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." In good condition. Stands on west side of the east Cascade Valley road, about 125 feet southeast from a pine tree, and about 300 feet north of Mrs. Grimm's house. On line between Mrs. Grimm and Frank Plunket.

Monument No. 24. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Northeast and northwest corners chipped; otherwise in good condition. Stands on east side of west Cascade Valley road, about 700 feet south of Mrs. Grimm's house. On line between S. C. Rice and Mrs. C. H. Grimm.

Monument No. 25. Railroad Stone No. 1.

A steel I-beam, 5 x 3 inches, its top 9 inches above ground, level with the top of railroad rails. Has metal plates on north and south sides, with "N. Y." and "Pa." inscribed, respectively, thereon. Stands between the two main tracks of the Erie Railroad. A state sign-board stands on west side of tracks.

Monument No. 26. Mile-stone No. 12.

Made of granite, 6 x 6 inches, 2 inches above surface of ground, or stone pile. On south side are the letters "Pa."; on north side "N. Y."; on east side "12 M." In good condition. To find this monument turn from the west Cascade road at the old stone dock at the railroad; go up a steep hill to abandoned quarry, then west by a good path for about 500 feet to the summit of the ridge. At this point can be seen the line across the river on the opposite mountain. The stone stands just where the ground slopes to the north quite steeply, and north of a big boulder 4 or 5 feet high, which forms a table or cave. Thirteen paces northeast from four or five big rocks lined up north and south, and from 8 to 10 feet high. Is in quite heavy timber, but at this point one can see out of woods. Witness trees about stone. Is very difficult to find.

Monument No. 27. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." All four corners of monument are chipped. Stands on north side of road, 4 feet west of a big chestnut tree, at a bend in the road which runs north and west from Lanesborough to Windsor. On properties of G. E. and J. F. McCune.

Monument No. 28. Railroad Monument No. 1.

A steel I-beam, 5 x 3 inches, 8 inches above surface of the ground. In good condition. Has metal plates on the north and south sides with "N. Y." and "Pa." inscribed, respectively, thereon. Stands 30 inches west of the westerly railroad track of The Delaware and Hudson Company, about 7 feet southeast from block station No. 135-4, which is about 25 feet high.

Monument No. 29. River Stone No. 1.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." It stands 19 paces east of eastern shore of the Susquehanna river, in level meadow ground, 16 paces west of a large chestnut tree, which is on line. Between properties of J. F. McCune and M. F. Cumford.

above ground, in good condition. On southwest side are the letters "G. B."; on southeast side "O."; on northwest side "N. Y."; on northeast side "15 M." Has diagonal grooves, and marks corners of the townships of Great Bend and Oakland, in Susquehanna county, Pa. Stands in cleared fields, at the south end of rail fence running north, 9 paces south of a small maple tree, about 557 feet west of Monument No. 37. On line between properties of Haxton and Bevens.

Monument No. 39. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on northeast side of a road which follows the state line for a short distance, on a bank about 15 feet higher than roadbed, and about 100 feet east of a small brook. On line between Elias Eighmy and Addison Brush.

Monument No. 40. Mile-stone No. 16.

Made of granite, 6 x 6 inches. On south side are the letters "Pa."; on north side "N. Y."; on east side "16 M." In good condition. Stands in swampy ground under rail fence about 250 feet west of where the road leaves boundary line and turns north. On line between H. E. Brush and N. W. Stone. This stone was reset in 1904.

Monument No. 41. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Southeast corner chipped; otherwise in good condition. Stands in thick woods, 4 feet northwest from a blazed maple, on east side of a wood road going up hill from main road, turning off from main road at two large pine stumps. These stumps are sawed off close to the ground. On property of Marcus Colville.

Monument No. 42. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. In good condition. Is on east side of road leading from Windsor to Great Bend. On property of Marcus Colville.

Monument No. 43. Mile-stone No. 17.

Made of granite, 5 x 6 inches, 10 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "17 M." Stands in a cleared field, 40 feet from brow of hill, 7 feet south of line fence, 370 feet east of Monument No. 44, and 3 paces east of a maple tree. On line between Marcus Colville and A. Judd.

Monument No. 44. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Northwest corner chipped; otherwise in good condition. Stands on west side of road leading from Great Bend to Windsor, is west of valley, 3 paces south of line fence, and about 12 feet south of maple tree 14 inches in diameter. On line between W. W. Judd and Marcus Colville.

Monument No. 45. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. In good condition. Stands in cleared field, on east side of a good private road which ends about 500 feet north of stone. On line between properties of Felton and Casey Kelder.

Monument No. 46. Mile-stone No. 18.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. In good condition. Stands about 12 feet south of old brush fence in a small cleared space, and is easily found by following the right hand path from Monument No. 45, which is used for wagons. Is on line between Bush and Casey Kelder.

Monument No. 47. Highway Stone No. 1.

Made of granite, 12 x 6 inches. Found monument 18 inches above ground, loose and leaning. Reset its top 12 inches above ground, in good condition. Has all four corners slightly chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading along the east branch of Trowbridge creek, about 300 feet southwest of B. J. Roosa's house. On line between B. J. Roosa and Myles Rickard.

Monument No. 48. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Great Bend to Windsor, and at a junction with road running easterly. On line between Myles Rickard and Louis Wernstorff.

Monument No. 49. Mile-stone No. 19.

Made of granite, 6 x 6 inches, 2 inches above surface of ground. In good condition. Stands under a line wire fence on a very steep easterly slope, in thick woods of heavy timber about 465 feet west of Trowbridge creek, 5 feet north of a red oak, 12 feet south of a white oak (both witness trees), and 165 feet east of "Fantail Corner," which is of rough native stone 16 inches high, 10 inches wide and 4 inches thick. Marks the corner of six Pennsylvania subdivisions. An old original stone stands on west side of monument. On line between Myles Rickard and Louis Wernstorff.

Monument No. 50. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of ground. All four corners chipped. Stands on east side of a private road, 75 feet south of Flynn's house and 250 feet east of a barn. On property of Peter Bush.

Monument No. 51. Town Stone No. 1.

Made of granite, 6 x 6 inches, stands 8 inches above surface of ground. Has diagonal grooves, and marks the towns of Kirkwood and Windsor, in Broome Co., New York. On southeast side are the letters "Pa."; northwest side "K."; northeast side "W." Stands in open field about 95 feet southwest from a large white barn, and 10 feet south of wire fence. On property of Peter Bush.

Monument No. 52. Mile-stone No. 20.

Made of granite, 6 x 6 inches, stands 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "20 M." Stands in open field, 237 paces east of Monument No. 53, which is on river road. On line between Solon Flynn and T. R. Mesick.

Monument No. 53. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; and on north side "N. Y." Stands on east side of river road, which is east of the Susquehanna river, in an open field, 33 paces northwesterly from the northwest corner of Solon Flynn's house. On line between S. Flynn and T. R. Mesick. The report of 1901 gives this stone as being 256.3 feet south and 142.3 feet east of the center of astronomical station, which is marked by a granite monument buried 25 feet under ground.

Monument No. 54. Railroad Stone No. 1.

A steel I-beam, 5 x 3 inches, its top level with the top of railroad rails and in good condition. Has metal plates on the north and south sides with "N. Y." and "Pa." inscribed, respectively, thereon. Stands between the two main tracks of the Erie R. R. A state sign-board stands on east bank with "New York and Pennsylvania State Line" thereon. Reset in 1904.

Monument No. 55. Mile-stone No. 20-3/8. River Stone.

Made of granite, 6 x 6 inches, top flush with surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "20-3/8 M." Stands in cleared field, 22 paces west of hickory tree, which is nearly on line, and 7 paces east of river bank. On line between John Cline and E. R. Mesick.

Monument No. 56. Railroad Stone No. 2.

Made of granite, 6 x 6 inches, 4 inches above grade of railroad bed. On south side are the letters "Pa."; on north side "N. Y." Is badly chipped on all corners and sides. Stands between the two tracks of the Delaware, Lackawanna & Western R. R., about 200 feet east of Monument No. 57. A V-shaped state sign stands on west side of tracks with the words "New York" and "Pennsylvania" thereon.

Monument No. 57. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 6 inches above the surface of ground. On south side are the letters "Pa."; on north side

"N. Y." Northwest and northeast corners chipped. Stands on west side of road about 20 feet from track of road, and on the west side of the Susquehanna river. On line between Forboss and Wm. Snedaker.

Monument No. 58. Mile-stone No. 21. Township Corner Stone.

Made of granite, 6 x 6 inches, and stands in a pile of native stone. In good condition. On southeast side are the letters "G. B."; on southwest side "L."; on northwest side "N. Y."; on northeast side "21 M." Has diagonal grooves and marks corners of townships of Great Bend and Liberty in Susquehanna county, Pa. Stands 7 paces southeast of a blazed oak tree about 18 inches in diameter, 9 paces just south of east of a small hemlock, where the ground begins to slope to the northwest quite sharply; about 60 feet just south of west from two small hemlocks three or four inches in diameter. Difficult to find, as there is not much left to indicate the line. Could not learn names of land owners here.

Monument No. 59. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 22 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in open field, east of a small house in Pennsylvania, about 75 feet west of the foot of a hill. There is no highway here at all. On property of Daniel English.

Monument No. 60. Mile-stone No. 22. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "22 M." The southwest and northeast corners badly chipped; otherwise in good condition. Stands in open field on west side of Montrose and Binghamton turnpike. On line between A. C. Walker and M. Sullivan.

Monument No. 61. Mile-stone No. 23.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on

east side "23 M." All four corners chipped; otherwise in good condition. Stands on southerly slope in cleared fields and east of an old lane which leads from Kaufman's house, and on the west of which is underbrush; woods on hill to the north. On property of F. Kaufman.

Monument No. 62. Mile-stone No. 24.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "24 M." Stands in cleared field 329.7 feet east of Monument No. 63, 24 paces southeast from three hemlocks, and about 20 feet south of a rail fence. On property of Fred Adams.

Monument No. 63. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. In good condition. Stands on west side of road leading from Brookdale to Conklin Forks, at south end of an old stone fence. On property of Fred Adams.

Monument No. 64. Mile-stone No. 25.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "25 M." Stands on east side of a dry knoll between two swamps at south edge of a small grove of white poplar, 7 paces north of wire fence. On line between Eugene Wilbur and Thos. Wilbur.

Monument No. 65. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Has all four corners chipped. Stands on west side of road leading from Brookdale to Binghamton, in a pile of native stone north of a low maple tree. On line between Eugene Wilbur and Wm. Mossier.

Monument No. 66. Mile-stone No. 26.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north

side "N. Y."; on east side "26 M." Stands at top of a steep northerly slope in an old slashing about 8 feet north of a beech tree 8 inches in diameter; 90 feet northwest of a line fence; 300 feet north of Geo. Buchanan's barn. To find this monument follow old wood road to a corner of a line fence and a short piece of fence running south, then follow into brush north of west 90 feet. On line between Geo. Buchanan and Adelbert Tripp.

Monument No. 67. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; all four corners chipped. Stands on south side of boundary line road at corner of rail and wire fence. On line between Alpheus Whipple and Adelbert Tripp.

Monument No. 68. Mile-stone No. 27. Township Corner Stone.

Made of granite, 6 x 6 inches, 20 inches above surface of ground, loose and leaning. Reset its top 6 inches above surface of ground, in good condition. On southeast side is the letter "L."; northwest side "N. Y."; on northeast side "27 M." Stands on south side of boundary line road in corner of rail fence, on northerly slope of land, 197 feet west of Monument No. 67. Has diagonal grooves and marks the corners of the townships of Liberty and Silver Lake, in Susquehanna Co., Pa. On line between Alpheus Whipple and J. Conte.

Monument No. 69. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road, just where boundary line road begins and is about 250 feet north of Coyle's house. On line between Michael Coyle and Peter Brady.

Monument No. 70. Mile-stone No. 28.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." and "28 M." Southeast corner is chipped. Stands on

west side of highway, and about 30 feet west of beaten track of road leading northerly to Binghamton. Underbrush on south side of road, and cleared fields on north side. To reach stone leave road running east and west at school house and go northerly. On line between Jas. Chapman and Thos. Monahan.

Monument No. 71. Mile-stone No. 29.

Made of granite, 6 x 6 inches; top flush with top of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "29 M." Stands 4 feet north of an old stone wall and new board and wire fence; 21 paces west of a big black ash tree, which stands at the south end of a stone and wire fence, and 1,415 feet east of Monument No. 72. On line between Thos. Gahagan and D. Donavan.

Monument No. 72. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 4 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Southeast corner chipped. Stands on west side of road leading from Brackney to Hawleyton, 1,415 feet west of Monument No. 71. In line fence and on line between Isaac B. Gage and Mrs. O. Miner.

Monument No. 73. Mile-stone No. 30.

Made of granite, 6 x 6 inches, 20 inches above surface of ground, loose and leaning. Reset its top 6 inches above surface of ground; in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "30 M." Stands in pasture field, 75 feet west of brook about 125 feet east of two maple trees, and 875.6 feet east of Monument No. 74. On property of Thos. Monahan.

Monument No. 74. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. All four corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Silver Lake road, about 250 feet south of a blacksmith shop, and 50 feet south of north end of stone fence. On property of Thos. Monahan.

Monument No. 75. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. All corners and sides badly chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on south side and east end of boundary line road. On line between Michael Cannon and Frank Cameron.

Monument No. 76. Mile-stone No. 31. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." and also "31 M." Stands on south side of boundary line road. On west side of monument is an old original stone marked on south side "Pa."; on north side "N. Y." On property of Wm. Lossey.

Monument No. 77. Mile-stone No. 32. Township Corner Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. On top are diagonal grooves. On southeast side the letters "S. L."; on northwest side "N. Y."; on northeast side "32 M." Marks the corners of the townships of Choconut and Silver Lake in Susquehanna Co., Pa. Its north and south corners and west side are badly chipped; otherwise in good condition. Stands on a gentle westerly slope about 30 feet south of a large chestnut tree, which is surrounded by smaller trees. To find this monument go up hill back of John Hickey's house, keeping left hand road just south of cliff of high rocks, follow old rail fence to the end, then about 75 feet east to stone. On line between properties of Wm. Clark and Samuel Lee. Hard to find.

Monument No. 78. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Has all four corners chipped. Is on west side of Choconut creek road, in line fence; about 400 feet north of John Hickey's house. On line between John Hickey and Wm. Round.

Monument No. 79. Mile-stone No. 33.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north

side "N. Y."; on east side "33 M." Stands in line of board fence, on the east side of mountain west of Choconut creek valley, about 935 feet west of creek, and 4 paces northwest of two large maple stumps nearly on line. On line between John Hickey and Wm. Round.

Monument No. 80. Mile-stone No. 34.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "34 M." Stands just southeast from a shale rock in a thick growth of small poplars, and is on a southeasterly slope about 80 feet west of west branch of a small brook, and about 600 feet east of the summit. Flat stones are piled about the monument, and it is very hard to find. To reach this stone go to Simon Warfles' house, which is near the woods, then take path into woods leading to the poplars mentioned above, which are four or five inches in diameter. On line between John Dean and Simon Warfles.

Monument No. 81. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of an abandoned road at the corner of a good road running north and south, just where it turns to the east. On property of J. C. Underwood.

Monument No. 82. Mile-stone No. 35.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; and on east side "35 M." Stands on west side of an old abandoned road going to the old abandoned house of Dean's, at a point where road turns south; the land slopes to the south here, and a small patch of timber is on east side of stone. In the valley at the south are old buildings. On line between Thos. Dean and Simon Warfles.

Monument No. 83. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On the south side are the letters "Pa."; on north side

"N. Y." Northeast and southeast corners badly chipped. Stands in line of an old stump fence in cleared fields on the north and underbrush on the south; is about 250 feet southwest from Eggleston's barn, and 850 feet east of the end of the private road. To reach monument go in from Tracey Creek road. Is of no use as a highway stone. On line between Card and Night, also Worrick.

Monument No. 84. Mile-stone No. 36.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "36 M." Stands in cleared fields in line of a stump fence, on level ground and 90 paces west of Monument No. 83. On line between Card and Night, also Worrick.

Monument No. 85. Mile-stone No. 37.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "37 M." All corners and edges are badly chipped, and part of the figure "3" in 37 is gone. Stands under line wire fence on a westerly slope, at south edge of thick woods in a cleared field, 200 paces east from creek, and 1,028 feet east of Monument No. 86. On line between DuBois and Dan O'Shaughnessy.

Monument No. 86. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Is on west side of road leading from Bowbridge to Tracy Creek, 900 feet north of Michael Crimmins's house. On line between Michael Crimmings and Geo. DuBois.

Monument No. 87. County Stone No. 1.

Made of granite, 6 x 6 inches, 6 inches above a pile of native stone. In good condition. On southwest are the letters "Pa."; on northwest side "T. Co."; on northeast side "B. Co." All

four corners badly chipped. Has diagonal grooves, and marks the corners of Broome and Tioga counties in New York state. Stands in a cleared field, under a stump fence, running north and south on slightly sloping ground to the west, and is about 1,600 feet west of summit of ridge; also south of thick woods, and 809.6 feet east of Monument No. 88. To find this stone go east of Miss Julia Shaughnessy's house to first pair of bars on easterly side of road; then through fields and small timber into fourth field to stump fence mentioned above, going in a northerly direction from road. On line between Jinks and Borden. Hard to find.

Monument No. 88. Mile-stone No. 38.

A steel I-beam, 5 x 3 inches, 18 inches above surface of ground. In good condition. Has metal plates on north, south and east sides with "N. Y." "Pa." and "38 Miles" inscribed, respectively, thereon. Stands on a westerly slope 5 feet east of an old wood road, just in the woods from the northwest corner of a clearing, and 809.6 feet west of Monument No. 87. On line between Jinks and Borden.

Monument No. 89. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Four corners chipped. Stands on south side of road leading from Little Meadows to Tracy Creek, about 10 feet from track of road, and about 170 feet southeast from Card's barn in small brush. On line between Mylo Card and Mrs. Caroline Barton.

Monument No. 90. Mile-stone No. 39. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "39 M." Stands on south side of road leading from Little Meadows to Tracy Creek, about 12 feet north of bank of creek, and in cleared field about 8 feet east of a large maple tree, nearly on line. On line between S. A. Pitcher and Rodney Williams.

Monument No. 91. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 24 inches above surface of ground, loose and leaning badly. Reset its top 12 inches above surface of ground and in good condition. On south side are the letters "Pa."; on north side "N. Y." Its northeast and southwest corners chipped. Is on north side of boundary line road, about 75 feet east of fork of road leading from Little Meadows to Tracy Creek. On line between Ward Duell and S. A. Pitcher.

Monument No. 92. Mile-stone No. 39½.

Made of granite, 6 x 6 inches, 16 inches above surface of ground, leaning and loose. Reset its top 6 inches above the surface of ground and in good condition. On south side are the letters "Pa."; on north side "N. Y."; and on east side "39½ M." Stands on westerly slope, in cultivated field, under line wire fence, about 75 feet east of Jones's creek. On line between Duell estate and Ellis Pendleton. It is in the meridian of astronomical station, Little Meadows, 2.41 feet south of center of station.

Monument No. 93. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." All four corners chipped. Stands on east side of road leading from Little Meadows to Apalachin, opposite residence of D. Holland. On property of J. H. Guyles.

Monument No. 94. Mile-stone No. 40. County Stone No. 1.

Made of granite, 6 x 6 inches, 4 inches above surface of ground. In good condition. On southeast side are the letters "S. Co."; on southwest side "B. Co."; on northwest side "N. Y."; on northeast side "40 M." Has diagonal grooves and marks the corners of Susquehanna and Bradford counties in Pennsylvania. Stands on a steep northerly slope, in northeast corner of timber, and about 20 feet in the woods just west of summit of the north end of the ridge and west of Apalachin creek; also at west end of line fence. On line between J. H. Fox and Edward Notewire.

Monument No. 95. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 18 inches above surface of ground, very loose and in bad shape. Reset its top 12 inches above surface of ground and in good condition. On south side are the letters "Pa."; and north side "N. Y." All four corners chipped. Stands on northwest side of road, 1,000 feet north of Frank Gibson's house. On line between Frank Gibson and Mrs. Sherwood.

Monument No. 96. Mile-stone No. 41.

Made of granite, 6 x 6 inches, 2 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "41 M." Stands in northeast corner of a cleared field north of woods and at the foot of a steep, northerly slope about 6 feet south of an old stone wall. To find this stone go in back of Notewire's house up a steep hill, then through sugar maple grove into second cleared field, where stone stands. On line between E. Notewire and Edward Keeler.

Monument No. 97. Mile-stone No. 42.

Made of granite, 16 x 6 inches, 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "42 M." Stands on level ground, in a cleared field, about 4 feet from line fence, 1,450 feet east of Monument No. 98. On north side of line is small undergrowth. On line between Alexander Guiles and Clarence Corben.

Monument No. 98. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading to Owego, at northeast corner of an apple orchard, 400 feet south of A. Guiles' house. On line between Alexander Guiles and J. H. Fox.

Monument No. 99. Mile-stone No. 43. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. Four corners and edges badly chipped; otherwise in

good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Owego and Milford turnpike at its intersection with Price's Hollow road. On line between Geo. Harrington and Coburn.

Monument No. 100. Mile-stone No. 44. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "44 M." The northeast corner is chipped, and a piece is broken off from the south side. Stands on land which slopes to the east, 120 feet west of brook, 15 feet east of road and 2 feet north of line fence. On line between L. C. Wilson and A. R. Gifford.

Monument No. 101. Milestone No. 45. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. Southwest corner slightly chipped. On south side are the letters "Pa."; on north side "N. Y."; on east side "45 M." Stands on west side of road leading from Cadiz post-office to Montrose turnpike, about 500 feet north of Holmes's house and near the most southerly of four small maples on west side of road. On property of Thos. Holmes.

Monument No. 102. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. All four corners slightly chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road which follows the valley of Babcock creek. To reach this monument drive across fields, going in back of Thos. Holmes's house. Monument in good condition. On line between Ore Brown and F. C. Waite.

Monument No. 103. Mile-stone No. 46. Township Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. Four corners chipped; otherwise in good condition. On

south side are the letters "Pa."; on the western half of the south side the letters "Wi."; on the eastern half of the same side "Wa."; on north side "N. Y."; on east side "46 M." It serves as a highway stone and marks the corners of the townships of Warren and Windham in Bradford county, Pa. Stands on west side of road leading from Waite's settlement to Owego, just south of sluiceway which crosses the road; west of monument are two pine trees and one maple on line. On line between Orcemus Brown and Paul Buck.

Monument No. 104. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. On south side are the letters "Pa."; on north side "N. Y." Has southeast corner slightly chipped; otherwise in good condition. Stands on west side of road leading to Owego, about 200 feet north of summit of ridge; two large oak trees are just west of stone on line. On line between properties of Paul Buck and J. H. Waite.

Monument No. 105. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. Southwest and southeast corners slightly chipped; also a piece is broken off from the north side; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Cliff Market to Owego, about 200 feet south of Walter Cliff's house, just where the road makes a sharp turn to the east for about 100 feet, then runs south. On line between Jerry Waite and Amos White.

Monument No. 106. Mile-stone No. 47.

Made of granite, 6 x 6 inches, 24 inches above surface of ground. Northeast corner slightly chipped; otherwise in good condition. Reset its top 6 inches above ground. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road about 30 feet south from the corner of a stone fence which runs north and south. On line between D. T. Easton and Frank Fedora.

Monument No. 108. Mile-stone No. 48.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. Has southeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "48 M." Stands in cleared field (sloping easterly), 49 paces west of an old log house; northwest of a large maple tree; timber on the southeast. To reach this monument, go in from Monument No. 109, about 300 feet west of brook and about 400 feet west of Walter Tripp's house. On property of Walter Tripp.

Monument No. 109. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground, loose and leaning. Southwest corner chipped. Repaired and left in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Linden to Waverly about 300 feet north of Walter Tripp's house, in line fence. On property of Walter Tripp.

Monument No. 110. Mile-stone No. 49.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "49 M." Stands in thick woods on summit of ridge east of Wappasening valley. To find this stone go in from J. J. Reynolds's house west and nearly on top of ridge, through meadow, then to southwest corner of a brush lot, then 22 paces west into woods from wire fence. Very difficult to find. On line between J. J. Reynolds and Jas. Morey.

Monument No. 111. Mile-stone No. 50. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "50 M." Stands on south side of boundary line road in line of a low stone fence, about 100 feet southeast of a barn and 125 paces east of Monument No. 112. On line between U. G. Russell and A. M. Howell estate.

Monument No. 112. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. All four corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road at junction with a road leading south to Raysville. On line between U. G. Russell and A. M. Howell estate.

Monument No. 113. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 6 inches above surface of ground. Has four corners badly broken; otherwise in good condition. Stands on north side of boundary line road at junction with a road running north and south on east bank of Wappasening creek, about 75 feet southwest of J. E. Weller's house. On line between J. E. Weller and A. M. Howell estate.

Monument No. 114. Mile-stone No. 51.

Made of granite, 6 x 6 inches, 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "51 M." Stands on south edge of woods in cleared field in line of a rail fence; is about 15 feet west of a big chestnut tree, which is on line, and about 600 feet north from a sharp turn in the road to the west. On line between Frank Briggs and Clinton Johnson.

Monument No. 115. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of ground. Southwest and northwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of a road from Nichols to Rome, about 300 feet north of L. J. Miller's house. On line between G. W. Barnes and L. J. Miller.

Monument No. 116. Mile-stone No. 52. Township Corner Stone No. 1.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. Has diagonal grooves, and its corners and edges slightly chipped; otherwise in good condition. Marks the corners of the townships of Windham and Litchfield, in Bradford county, Pa.

On southeast side is the letter "W."; on southwest side "L."; on northwest side "N. Y."; on northeast side "52 M." Stands on bank about 100 feet east of Little Wappasening creek, on easterly slope, 67.75 feet east of Monument No. 117. On line between Johnson Rogers and Scott Bennett.

Monument No. 117. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 2 inches above surface of ground. Corners and edges slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road running along west bank of Little Wappasening creek, about 50 feet northeast of J. Rogers' house, close to track of road. To find this stone, go in from main road up creek. On line between Johnson Rogers and Scott Bennett.

Monument No. 118. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 18 inches above surface of ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road which follows the left bank of Little Wappasening creek, northerly into Nichols about 300 feet northeast of Mrs. Lee's house, and at foot of easterly slope. On line between J. Rogers and Mrs. Lee.

Monument No. 119. Mile-stone No. 53.

Made of granite, 6 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "53 M." Stands in cleared field under stump fence running east and west on high ground which slopes to the south. Quite large oak trees are on line to the west. Is about 100 feet east of stump fence running north and south. On line between Pat Hunt and Zina Goodsell.

Monument No. 120. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at the east end of an old abandoned

boundary line road on a southerly slope in cleared field about 8 feet north of a stump fence. Is of no use as a highway stone. On line between A. D. Parks and Mrs. Schumaker.

Monument No. 121. Mile-stone No. 54.

Made of granite, 12 x 6 inches, 30 inches above surface of ground, learning and very loose. Reset its top 8 inches above surface of ground and in good condition. Has southeast corner chipped. On south side are the letters "Pa."; on north side "N. Y."; on east side "54 M." Stands on south side of an old abandoned boundary line road in line of stump fence just where a rail fence runs south, and is 640 feet east of Monument No. 122. Is of no use as a highway stone. On line between Horton and J. Washburn.

Monument No. 122. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road running north and south, 640 feet west of Monument No. 121. On line between John Washburn and H. Horton.

Monument No. 123. Mile-stone No. 55.

Made of granite, 6 x 6 inches, 8 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "55 M." Stands on southerly slope in cleared field about 185 feet east from and in front of G. C. Stauff's house, about 150 feet southwest from barn. On line between G. C. Stauff and A. D. Chandler.

Monument No. 124. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. Four corners and edges chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at west end of a short piece of boundary line road just where it turns to the southwest about 300 feet west of G. C. Stauff's house. On property of A. D. Park.

Monument No. 125. Summit Monument.

A steel I-beam, 5 x 3 inches, 14 inches above surface of ground. In good condition. Has metal plates on north and south sides with "New York" and "Pennsylvania" inscribed, respectively, thereon. Stands in cleared field about 12 feet north of wire fence running east and west. On a high ridge overlooking the valley of the Susquehanna flats. From this point the towns of Sayre, Athens and Waverly may be seen; land slopes southwest and west. On property of A. D. Park.

Monument No. 126. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. Southeast and northeast corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at east end of boundary line road where it turns to southwest, about 100 feet northeast of northeast corner of porch of Park's house, and 28 feet west of Park's carriage barn. On property of A. D. Park.

Monument No. 127. Mile-stone No. 56.

Made of granite, 6 x 6 inches; top of stone buried 3 or 4 inches under ground, the lettering being covered. A steel I-beam, 5 x 3 inches, stands 20 feet 7 inches directly south as an index to Monument No. 127. Has metal plate on east side with "56 Miles" thereon. Its top is 18 inches above surface of ground. Stands 125 paces west of Monument No. 126. On property of A. D. Park.

Monument No. 128. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Four corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of the river road, on left bank of the Susquehanna river in front of cemetery and at the west end of boundary road. On property of A. D. and Murker Park.

Monument No. 129. River Stone No. 1.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. All four corners chipped, but otherwise in good con-

dition. On south side are the letters "Pa."; on north side "N. Y."; the upper part of the letter "Y" in New York is gone. Is located on river flats and in cleared field about 30 feet east of the left bank of the Susquehanna river. On line between property of A. D. Park and Murker Park.

Monument No. 130. River Stone No. 2.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands 50 feet west of right bank of the Susquehanna river, about 40 feet north of Silas Cook's house and in line of wire fence. On line between Silas Cook and Hill.

Monument No. 131. Mile-stone No. 57.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Three corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "57 M." Is located in a cleared field in line of wire fence, 22 paces west of an 18-inch oak tree in thick bushes; is about 600 feet east of the Lehigh Valley Railroad. On line between Hill and Walcott.

Monument No. 132. Railroad Monument.

A steel I-beam, 5 x 3 inches, 14 inches above surface of the ground. In good condition. Has a metal plate with "Pennsylvania" inscribed on south side, and "New York" on north side. Located on west side of the Lehigh Valley R. R., and is 15 paces from the embankment. Six feet west of tracks is a stone monument painted white, 4 feet high, 24 inches wide and 4 inches thick. On the lower half of the east face reading from top of slab down is the word "Pennsylvania", and on the upper half, reading from top down, the words "New York." Both monuments on property of Lehigh Valley Railroad Co.

Monument No. 133. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. Edges and corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of the road leading from Ellison to Waverly,

about 200 feet northeast from the nearest of four oak trees. On line between Ellison and Woodruff.

Monument No. 134. Mile-stone No. 58.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "58 M." Stands on steep westerly slope of a narrow gravelly ridge in a cleared field, 1,550 feet east of Monument No. 135, and 165 feet east from a rough stone monument, that marks the corner of the subdivision of the Douglass military patent. On line between John Woodruff and Chas. Wilkerson.

Monument No. 135. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above the surface of ground. Northeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Is located on west side of road leading from Sayre to Owego, 15 feet west of sluiceway. On line between H. J. Bunnell and Rusten Smith.

Monument No. 136. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. All corners and edges chipped, and tops of all the letters gone; otherwise in good condition. On northeast side is the word "Pennsylvania" and on northwest side "New York." Stands between the two tracks of the Delaware, Lackawanna and Western Railroad, on a high embankment, at which point on the north side of tracks is a V-shaped sign.

Monument No. 137. Mile-stone No. 59.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "59 M." Is located in a cultivated field, about 100 feet north of a high embankment of the Delaware, Lackawanna and Western Railroad, and is 15 paces east of railroad wire fence. A state sign-board is on each side of the six tracks at this point.

Monument No. 138. Railroad Stone No. 1.

A steel I-beam, 5 x 3 inches, 14 inches above railroad bed. In good condition. Has metal plates with "Pennsylvania" on the south side and "New York" on the north side. Stands between the two most easterly of the six tracks of the Delaware, Lackawanna and Western Railroad. There is a V-shaped sign on east side of the six tracks with the words "Pennsylvania" and "New York" thereon. On the west side of tracks is a sign with "Chemung and Tioga Cos." This monument was reset in 1904.

Monument No. 139. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. Southwest and southeast corners slightly chipped, but otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Is located in the village of Factoryville, on the west side of Spring street, on the east side of board walk, about 10 feet south of Connell's grocery store. On property of Mr. Connell.

Monument No. 140. Railroad Stone No. 2.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Situated in the village of Waverly, on the southeast side of the southerly tracks of the Lehigh Valley Railroad. These tracks are used as sidings for empty cars.

Monument No. 141. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Wilcox street in the village of Waverly, about 150 feet south of Doyle street, and about ten feet west of fence. On line between Frank Hart and Mrs. McCarthy.

Monument No. 142. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 13 inches above surface of ground. Corners and edges chipped, but otherwise in good con-

dition. On south side are the letters "Pa."; on north side "N. Y." Situated in the village of Waverly, on west side of Spaulding street, between the sidewalk and road. On property of Mrs. Noonan.

Monument No. 143. Highway Stone No. 4.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Southeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Is located on west side of Pennsylvania avenue, in the village of Waverly, 150 feet south of bridge over Erie railroad tracks, and 10 feet east of fence. On property of P. B. Atley.

Monument No. 144. Mile-stone No. 60.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on the east side "60 M." Stands on the property of Mrs. Margaret Kenney, and at rear end of a garden which fronts on Railroad avenue, in the village of Waverly.

Monument No. 145. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On the south side are the letters "Pa."; on north side "N. Y." Stands on east side of Fulton street in the village of Waverly, 150 feet south of Erie railroad tracks, and 10 feet west of the southeast corner of the office of Genning's sash and blind factory. Six feet east of Monument No. 145, and in center of walk stands a granite stone, 6 x 6 inches; no inscription. On property of S. A. Genning.

Monument No. 146. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners and edges chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in the village of Waverly, on east side of Loder

street, 8 feet west of the porch of the Erie hotel, which stands on the southwest corner of Loder and Erie streets. The Erie hotel is on line.

Monument No. 147. Highway Stone No. 3.

Made of granite, 12 x 6 inches. Stands in the village of Waverly, nearly on top of a deep cut of the Erie railroad, under south end of Chestnut street bridge, which is over the Erie railroad tracks; stands on a steep slope, thus leaving it exposed on the north side 29 inches, and on the south side 8 inches. An old original monument of native stone stands 6 inches west. On property of Erie railroad.

Monument No. 148. Highway Stone No. 4.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Southeast and northeast corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in the village of Waverly on south side of Bradford street, 18 inches south of wire fence, which is in a small field north of D., L. & W. R. R. Is 390 feet east of Monument No. 149.

Monument No. 149. Railroad Stone No. 1.

A steel I-beam, 2 inches above road-bed. Stands between the center tracks of the Delaware, Lackawanna and Western railroad. In good condition. Reset in 1904. Has metal plates with the words "Pennsylvania" and "New York" inscribed, respectively, thereon. There is a V-shaped state sign on the north bank of the railroad.

Monument No. 150. Spanish Hill Monument.

Made of granite, 6 x 12 inches, 13 inches above surface of the ground. All corners and edges are chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on a high knoll about 100 feet south of the Delaware, Lackawanna and Western railroad tracks, in a cleared field about 60 feet south of railroad wire fence (on a hill) and about 200 feet west of a deep hollow which is at times filled with

water. Is 15 feet east of the old Spanish Hill Monument, which is reported to have been set as the $60\frac{1}{2}$ mile-stone. No figures of miles are visible on the old or new stones, but the old stone has on south side the word "Pennsylvania" and on north side "New York." On property of the D., L. & W. R. R.

Monument No. 151. Mile-stone No. $60\frac{1}{2}$.

Made of granite. 6 x 6 inches, 10 inches above the surface of the ground. All four corners chipped. On the south side are the letters "Pa."; on north side "N. Y."; on the east side " $60\frac{1}{2}$ " of which the "0" is the only figure legible. Stands in a meadow, 10 paces east of the left bank of the Chemung river, and about 50 feet south of the high embankment of the D., L. & W. R. R. On property of the Delaware, Lackawanna & Western R. R.

Monument No. 152. Mile-stone No. 61.

The report of the Department of Internal Affairs for 1901, page 64 A, gives the location of this monument as being on the right bank of the Chemung river at foot of slope of a high embankment of the Delaware, Lackawanna and Western railroad, buried under a pile of loose rocks and stones beneath a log, which stands in an upright position and whose end rests upon the stone, 21.1 feet south of the west abutment of the D., L. & W. R. R. bridge, and in line with a point 6 inches east of the face of the abutment above the bridge seat. The report of 1903, page 72A, says: "We found that the embankment now extends some 30 feet south of the west abutment of the D., L. & W. R. R. bridge; therefore the stone must be buried deeper under stones, logs, timbers, dirt and cinders than when the above mentioned report was made, and consequently we did not find this stone. The Railroad Co. should be made to unearth this monument." The same conditions exist now.

Monument No. 153. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, its top level with the road grade. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands between the two tracks of the Delaware, Lackawanna and

Western railroad, on whose north side is a sign-post with a V-shaped board on top, and the word "Pennsylvania" on the southwest side, and "New York" on the northwest side; is on a high embankment about 300 feet west of the west end of bridge. On property of the D., L. & W. R. R.

Monument No. 154. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading westerly from Waverly about 300 feet north of the D., L. & W. R. R.; is in line of board fence running north and south, and is at the east end of a fence running west. On property of the D., L. & W. R. R.

Monument No. 155. Mile-stone No. 62.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. Its southeast and southwest corners badly chipped; otherwise in good condition. On the south side are the letters "Pa."; on the north side "N. Y."; on the east side "62 M." Is located in a cleared field on level ground and at the north side of a field of scrub oak brush; is in an old dilapidated stone fence which is on line, and is 2,335 feet east of Monument No. 156. Is southeast from Sears's house, which is on road running east and west. On line between properties of Charles Sears and D., L. & W. R. R.

Monument No. 156. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. On the south side are the letters "Pa."; on the north side "N. Y." Stands on west side of road leading from Waverly to Wilawana, just where the road turns sharply to the south; there are pine trees on the east side of road at this point. On line between Chas. Sears and Thos. Rogers.

Monument No. 157. River Stone No. 1.

Made of granite, 6 x 6 inches, top-level with surface of ground. In good condition. On south side are the letters "Pa."; on

north side "N. Y." The high water washes dirt and flood wood over this stone, as it stands only about 15 feet east of the right bank of the Chemung river; is 6 paces east of an elm tree, which is 8 inches in diameter, and is surrounded by thick brush. On line between Chas. Sears and I. P. Shepard.

Monument No. 158. Mile-stone No. 63.

Made of granite, 12 x 6 inches, top level with surface of the ground. In good sondition. On south side are the letters "Pa."; on north side "N. Y."; on west side "63 M." Highway stone on east side of an abandoned private road, in cleared field under line wire fence, about 300 feet east of a white pine tree, and about 500 feet south of Wynkoop creek. To reach this monument follow lane in back of J. R. Holbert's house southerly to stone. On property of Wm. Holbert.

Monument No. 159. Mile-stone No. 64.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on the north side "N. Y."; on the east side "64 M." Stands in a cleared field about 704 feet east of Monument No. 160, four feet south of a stone wall running east and west and about 100 feet west of a grove of large oak trees. On property of J. D. Buley.

Monument No. 160. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of a road leading southerly from the village of Chemung, 11 paces west of an apple tree, which stands at side of fence on east side of road; is about 250 feet northwest from Buley's house. On property of J. D. Buley.

Monument No. 161. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On the south side are the letters

"Pa."; on north side "N. Y." Stands on west side of river road leading from Chemung to Wilawana about 200 feet south and in front of R. B. Vangorder's house. On line between Vangorder and A. Parshall.

Monument No. 162. Mile-stone No. 65. Township Corner Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On southeast side is the letter "A"; on southwest side "R."; on northwest side the letters "N. Y."; on the northeast side "65 M." Has diagonal grooves and marks the corners of the townships of Athens and Ridgebury in Bradford county, Pa. Stands in a cultivated field under line board fence, 17 paces west of a hickory tree and just east of two walnut trees; is about one-fourth of a mile west of Monument No. 161. On line between Jas. Orcutt and A. Parshall.

Monument No. 163. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. All four corners chipped; otherwise in good condition. On the south side are the letters "Pa."; on north side "N. Y." Stands 7 paces west of the westerly track of the Delaware, Lackawanna and Western Railroad, near which is a V-shaped sign with the words "Pennsylvania" on one side and "New York" on the other.

Monument No. 164. Mile-stone No. 66.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on the north side "N. Y."; on the east side "66 M." Stands on a steep northeasterly slope in thick woods, about 400 feet east of the northeast corner of a small clearing, and is surrounded by three blazed oak trees, two of which are about 18 inches in diameter, the other 8 inches in diameter, and all of which stand within a radius of 10 feet. About 50 feet northeast and down the hill from a pine tree 12 inches in diameter. Very hard to find. To reach this stone go east from Monument No. 165. On line between G. W. Griswold and Mrs. T. O. Davidson.

Monument No. 165. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. All four corners and sides chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in a cleared field on west side of an abandoned road just where it turns sharply to the southeast. To find this stone take the abandoned road from river road and go up a steep hill. On property of Mr. Ryan.

Monument No. 166. Mile-stone No. 67.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "67 M." Stands in thick woods on a steep northwesterly slope. To reach this stone go from Monument No. 165 back to river road, thence to what is called "Durkey road," leading up a steep hill; follow this road to an old log road just west of bridge, which is at turn of road leading nearly southerly to an old mill site; go along the creek until the remains of an old bridge are reached, thence east about 500 feet to a wood road on the right; follow this road about 200 feet to a wood road which leads southerly up a steep hill. The stone is located 3 feet west of this road and 3 feet from a white oak tree, 8 inches in diameter. It stands in a cleared space, and is very hard to find. On line between Burt Hewitt and Henry Hillman.

Monument No. 167. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in center of Durkeyville road which runs southwesterly. This road turns sharply to the south here, and there is also a private road which leads northerly to John Burt's house. On line between John Burt and Robert Cassidy.

Monument No. 168. Mile-stone No. 68.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters

"Pa."; on north side "N. Y."; on east side "68 M." Stands 200 feet west of summit of a ridge on south edge of a thick wood; is also at a corner of a bush lot and at the east end of a rail fence. Is on the northeast corner of Richard Caldwell's farm and on line between Richard Caldwell, J. W. Burt and A. G. Hillman.

Monument No. 169. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on a high bank on east side of road leading southerly from Wellsburg about 150 feet north of Caldwell's house. On line between Daniel Caldwell and John O'Brien.

Monument No. 170. Mile-stone No. 69.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "69 M." Stands on northeasterly slope in dense woods and thick brush about 100 feet north of a wire fence. To reach this monument (which is hard to find) go up hill by an old log road to a wire fence, 25 feet north of which is a hemlock tree about 18 inches in diameter, and about 75 feet north of hemlock tree, down an old wood road, and 11 paces northwest from this road stands the stone, near which is a small oak, an old stub witness, and a fallen oak tree, whose top lies at stone. The old original mile-stone reading "N. Y. 69" is here in good condition. On property of Amos Roberts and Hiram Young.

Monument No. 171. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Bentley creek on a steep westerly slope, at south edge of a clearing, and at a corner of stone fence, which runs north and east. On line between Jos. Prescott and David Burt.

Monument No. 172. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Wellsburg to Troy, nearly opposite the residence of Edgar Griswold, upon whose property it stands.

Monument No. 173. Mile-stone No. 70.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "70 M." Stands on steep easterly slope overlooking the valley on the east, and 23 paces north of a wire fence, which is north of woods. Is 104 paces east of Monument No. 174. On property of Edgar Griswold.

Monument No. 174. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands near the village of Wellsburg, on west side of a steep road, near the summit of a ridge which is west of the valley of Bentley creek. On property of Edgar Griswold.

Monument No. 175. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All four corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of White's Hollow road, where it runs south-westerly; about 100 feet south of a pine tree and 8 feet north of a small maple. On line between H. W. Young and Leaman Ellsburry.

Monument No. 176. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of White's Hollow

road, on a southerly slope, about 800 feet southeast from Coleman's house. On line between H. W. Young and Chas. Coleman.

Monument No. 177. Mile-stone No. 71.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "71 M." Stands in cleared field on a southerly slope, just south of the corner of a stump fence, and 4 feet from a hickory tree which is 18 inches in diameter. Is 1,175 feet west of Monument No. 176, and next to an old stone marked "N. Y. 71" and "P." On line between Chas. Coleman and Richard Coleman.

Monument No. 178. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road running north and south; on opposite side of road is a chestnut tree on line; is about 450 feet south of woods. On line between Jas. Suffern and Gilbert Coleman.

Monument No. 179. Mile-stone No. 72.

Made of granite, 6 x 6 inches, top level with surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "72 M." Stands in a gap in a stone fence on south side of a patch of woods, about 600 feet from the north side of a lane, on a steep northwesterly slope about 800 feet west of the summit. To find this stone go east from Monument No. 180 and follow stone fence. Is about 10 feet southeast from an oak tree and about 10 feet southwest from a chestnut tree, both being witness trees. Is in a cleared field on property of Jas. Suffern.

Monument No. 180. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground, loose and leaning. Reset its top 12 inches above surface of the ground and in good condition. Four corners badly chipped.

On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Fassett to Elmira, 60 feet northeast of Crutty's house. On line between Thos. Crutty and Jas. Suffern.

Monument No. 181. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, top level with railroad grade. Edges and corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of the Northern Central railroad track, about 16 feet west of the west rail, under a sign-board which marks the two states.

Monument No. 182. Mile-stone No. 73.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "73 M." Stands in woods and brush under second wire fence running north and south and at junction of wire fence running west. To find this stone go in back of Mrs. E. A. Kindsman's house through cleared fields and a field of brush to a wire fence, and then follow fence east to stone. On line between A. C. Piervier and the Ellsburry estate.

Monument No. 183. Mile-stone No. 74.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. Northwest and southwest corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "74 M." Stands in line of stump fence, in swampy ground, about 15 feet west of a brook; is in a valley, in cleared field, and stands at the foot of an easterly slope, 1,180 feet east of Monument No. 184. On line between Ira Woods and Mrs. Ray Managon. Was reset in 1904.

Monument No. 184. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 22 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands under a stump fence in a pile of

native stone on north side of boundary line road at the junction of a road going south; is on level land, and in cleared field. On line between Joshua Shearer and James Hune.

Monument No. 185. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All four corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road, at the junction of road leading northerly to Elmira, and is about 100 feet southwest of T. Gates' house. On line between the properties of Joshua Shearer and Brewer.

Monument No. 186. Mile-stone No. 75. Township Corner Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground, leaning badly. We repaired by plumbing and tamping and left in good condition. On south side are the letters "Pa."; on west half of south face "W."; east half of south face "S. C."; on north side "N. Y." and "75 M." Is a highway stone as well as mile-stone, and stands on the north side of boundary line road, about 125 feet southeast from Benjamin Seitzer's house. This monument is the most northerly one on the boundary, its variation from the astronomical parallel of 42 degrees being 960 feet north. It marks the corners of the townships of South Creek and Wells, in Bradford county, Pa. On property of Benj. Seitzer.

Monument No. 187. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 18 inches above the surface of ground. All four corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west end of boundary line road, at west side of road running north and south. On line between A. D. Griswold and Benj. Seitzer.

Monument No. 188. Mile-stone No. 76.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Southeast, southwest and northwest corners chipped;

otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "76 M." Stands on a westerly slope, in cleared field, about 700 feet west of the summit, and about 10 feet south of a rail fence running east and west. On line between Palmer and Eaton.

Monument No. 189. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All four corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Bird creek road, about 75 feet south of brook crossing road and about 15 feet north of Smith's house. On line between Smith and Cowe.

Monument No. 190. Mile-stone No. 77.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "77 M." Stands in cleared level land in Bird creek valley, 204.5 feet west of Monument No. 189, and 5 paces south of board fence running east and west. On property of Mrs. Smith.

Monument No. 191. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Northeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at south end of and on west side of the Nichols road (now abandoned) in thick brush at northwest corner of woods. Cleared fields are on the south. On line between Pellett and Gosper. Go west from this stone to find Monument No. 192.

Monument No. 192. Mile-stone No. 78.

Made of granite, 6 x 6 inches, 16 inches above surface of the ground. Four corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "78 M." Stands in a cleared field, about 700 feet east of the summit of a very high steep ridge; is also east of Seeley creek, and 24 paces west of fence running north and south. Is

next to an old stone marked on the south side "Pa."; and on the north side "N. Y. 78." To reach this stone go west from Monument No. 191. On line between Reuben Berry and A. J. Nichols.

Monument No. 193. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All four corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Southport road, at south end of turnpike leading to Elmira, and is 43 paces southeast from the southeast corner of the State Line Hotel. On line between A. J. Pedrick and Mrs. Mary Weeks.

Monument No. 194. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. All four corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Is on east side of tracks of the Tioga branch of the Erie railroad, 5 paces west from section sign-post No. 2, and about 100 feet north of an abandoned road which crosses tracks.

Monument No. 195. Mile-stone No. 79.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." and "79 M." Stands on west side of an old abandoned road leading north up a hill from the railroad. Is at the east end of a stone wall fence on a high bank above the road, and is 450 feet west of Monument No. 194. On line between Wilson and Roy.

Monument No. 196. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 24 inches above surface of the ground, loose and leaning badly. Reset its top 12 inches above surface of ground and in good condition. All four corners chipped; there is also a large chip out of south side. Stands in a cultivated field, about 20 feet east of the north end of a road leading south into Millerton and about 50 feet north of a maple and an elm tree. On property of Nathaniel Wilson.

Monument No. 197. Mile-stone No. 80. County Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground, slightly leaning. Tamped dirt and stone about this monument, leaving it in good condition. On south side near top of stone are the letters "Pa."; on eastern half of same side are the letters "B. Co."; on western half "T. Co."; on north side are the letters "N. Y." and "80 M." It marks the corners of Bradford and Tioga counties in Pennsylvania. Stands in a valley in thick brush just at the south edge of a narrow swamp near a cultivated field. Cross this field to reach monument. Is 1,150 feet west of Monument No. 196, and on line between Jas. McSollery and Alvin Miller. There is an old original stone lying on top of ground marked "N. Y. 80" and "P."

Monument No. 198. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. Southwest and northwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in a cleared field at the west end of boundary line road, at its junction with a road running southerly to Millerton. Is on line between Alvin Miller and Thaddeus Mitchell.

Monument No. 199. Mile-stone No. 81.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "81 M." Stands in an old dilapidated line stone fence at the southeast corner of woods, and nearly on the top of a hill which slopes northeast. To reach this go in from Monument No. 198. Is 900 feet west of Monument No. 198, and on line between Alvin Miller and Alexander Lewis.

Monument No. 200. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road on a steep southerly slope at the west end of a stone fence; cleared fields are on the east and woods on the west; is about 150 feet west of Mrs. Russel's house. On line between Samuel Josh and Chas. Bly.

Monument No. 201. Mile-stone No. 82. County Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "82 M." Serves as a highway stone, and stands on the east side of a road running north and south, about 500 feet south of the summit; marks the corners of Chemung and Steuben counties, New York. On line between D. Miller and Frank Allen. Reset in 1904.

Monument No. 202. Mile-stone No. 83.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "83 M." Stands in cleared field upon the summit of a low ridge, about 15 feet west of end of a stump fence, and about 10 feet north of rail fence, in thick brush about 50 feet east of a rail fence running south from line fence, a balsam tree in line of fence, running south. To reach this stone go back of Mrs. Buchanan's house up the hill. On line between Wm. Kurnn and Mrs. Minerva Buchanan.

Monument No. 203. Mile-stone No. 84.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "84 M." Stands in cleared fields, 10 paces south of stone fence, north of barn. On line between M. Wheeler and Palmer Buchanan.

Monument No. 204. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All four corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road, about 150 feet east of a turn in road to the north. On line between Simon Nichols and Mrs. Anna Comfort.

Monument No. 205. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. All four corners and edges badly chipped; otherwise in

good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road at junction of road running northerly, and about 150 feet southeast of a small frame schoolhouse. On line between Eugene Tobey and S. L. Kelly.

Monument No. 206. Mile-stone No. 85. Highway Stone.

Made of granite, 12 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road, about 300 feet east of brook, 4 feet north of wire fence and about 8 feet from center of road. On line between Eugene Tobey and Christopher Tobey.

Monument No. 207. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road, at junction with road running southwesterly. On line between Christopher Tobey and Eugene Tobey.

Monument No. 208. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. Southeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at west end of boundary line road at east end of stump fence in cleared field. To reach stone go south down a lane to a road running east and west, then turn west to C. E. Anderson's house. On line between Christopher Tobey and Eugene Tobey.

Monument No. 209. Mile-stone No. 86.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "86 M." Stands on westerly slope about 800 feet west of summit, at south edge of thick woods, under a line stump and wire fence. To find monument go down a lane back of C. E. Anderson's buildings to an old stone bridge in a slight ravine, then southwest up a small hill through field to stone. On property of C. E. Anderson,

Monument No. 210. Mile-stone No. 87.

A steel I-beam, 5 x 3 inches, 14 inches above surface of ground. In good condition. Has metal plates with the words "Pennsylvania" and "New York" inscribed, respectively, thereon; on east side "87 Miles." Stands on a slight bank at east side of a narrow swamp, under line stump fence, 237.4 feet east of Monument No. 211. On line between J. W. Rockwell and Mary Niles.

Monument No. 211. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in thick brush on the west side of a road, about 300 feet south of Niles's residence. On line between Mary Niles and E. E. Rockwell.

Monument No. 212. Mile-stone No. 88. Town Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Has diagonal grooves and in good condition. On the southeast side are the figures "88 M."; on the southwest side the letters "Pa."; on the northeast side the letter "C."; on the northwest side "L." Marks the corners of the townships of Canton and Lindley, in Steuben county, New York. Stands at corner of line stump fence running north; is at southwest corner of a cleared field, at north edge of woods, and on a northeasterly slope. On line between Gerry Schumacker and Andrew Maxwell.

Monument No. 213. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Southwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Lawrenceville to Elmira, and is southeast of Wm. Seiger's house. On line between Wm. Seiger and H. Niles.

Monument No. 214. Mile-stone No. 89.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "89 M." Stands in line of

wire fence at junction of wire fence running north, 10 paces south of hickory tree; is east of Tioga river and about 500 feet from summit. On line between John Tillinghass and Mrs. Ellison.

Monument No. 215. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. All four corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Lawrenceville to Elmira, and just south of where the road turns sharply to the west. On line between Samuel Coons and M. M. Ballard.

Monument No. 216. Railroad Stone No. 1.

A steel I-beam, 5 x 3 inches, 4 inches below surface of ground. Has metal plates with the words "Pennsylvania" and "New York" inscribed, respectively, thereon. In good condition. Is located in center of a private driveway which is used continually; 7 feet west of the northwest corner of the ruins of the Erie railroad depot, and 7 feet east of the most easterly rail of the Erie railroad tracks. On the property of Harrison Bros., and Erie R. R.

Monument No. 217. River Stone No. 1.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in village of Lawrenceville about 100 feet north of State street, about 100 feet west of left bank of the Tioga river, in W. S. Smith's garden, and about 75 feet north-east of Smith's house. On line between W. S. Smith and Parkhurst estate.

Monument No. 218. Mile-stone No. 90.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. Southeast and southwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "90 M." Stands about 100 feet

north of State street in the village of Lawrenceville, about 6 feet east of the northeast corner of Cole's barn. There is an old original monument on west side bearing the inscription "Pa.", "N. Y." and "90 M." On line between Ray Cole and Hathaway.

Monument No. 219. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Main street, in the village of Lawrenceville, about 200 feet north of State street, and at the northeast corner of Hill's lot. On property of Jas. Hill.

Monument No. 220. River Stone No. 1.

Made of granite, 6 x 6 inches, 12 inches below surface of the ground. In good condition. On the south side are the letters "Pa."; on north side "N. Y." Stands about 100 feet east of the Cowanesque river, about 75 feet north of Mrs. Grant Freeling's house, 12 feet east of a big elm tree, and 12 inches west of fence post; in line wire fence. On line between B. H. Parkhurst and Mrs. Grant Freeling.

Monument No. 221. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. Northeast and south edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on the northwest side of Cowanesque river road and northwest from a grist-mill, at foot of steep northerly slope. On line between N. Eaton and Ellison.

Monument No. 222. Mile-stone No. 91.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Northeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "91 M." Stands on steep southerly slope in open woods about 250 feet west of the summit of ridge and 4 paces north of an oak tree, which is 8 inches in diameter, and 6 paces southwest from pine stump 18 inches in diameter. About 100 feet just a

little north of east from a tall pine tree 12 inches in diameter. To find monument go up steep hill back of Lamphere's house to northeast corner of clearing, where the fence ends, thence east through brush and woods about 965 feet to stone. Hard to locate. On line between E. B. Beaumont Jr., and Orville Patterson estate.

Monument No. 223. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on northeast side of an abandoned wood road in an old slashing of heavy timber, all cut down. To find this monument go west from Monument No. 222 into clearing; from northwest corner of clearing go about 150 feet south along east side of a brush patch to an old wood road, follow this old road northwesterly up a hill to stone. On line between Wm. H. Wood estate and Watson.

Monument No. 224. Highway Stone No. 2.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of an abandoned wood road. To reach this stone go from forks of road about 120 feet southwest on left-hand fork. Monuments Nos. 223 and 224 are of no use other than to mark the line, as the roads are not used. On line between Wood and Watson.

Monument No. 225. Mile-stone No. 92..

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "92 M." Stands on a gentle westerly slope in a small growth of timber. To find this monument go west from monument No. 224 through woods into a clearing, follow line stump fence to west end and go 19 paces due west into wood to stone. On line between Ford and Stewart.

Monument No. 226. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 25 inches above surface of the ground, loose and leaning. Reset its top 12 inches above surface

of ground and in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road where road makes a sharp turn northeasterly, and at the north edge of woods, about 200 feet southeast from S. A. Baker's house. On line between S. A. Baker and LeGrand Brant.

Monument No. 227. Mile-stone No. 93. Highway Stone.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Northeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "93 M." Stands on south side of boundary line road at north edge of woods, and about 2 feet north of an old line stump fence. On line between Ruth Slater and Chas. Baker.

Monument No. 228. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 24 inches above surface of the ground, leaning and loose. Reset its top 6 inches above surface of the ground and in good condition. Northwest and northeast corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road at its junction with road running south. On line between Mrs. Daniel Stoddard and Mrs. Polly Starr.

Monument No. 229. Mile-stone No. 94. Town Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. We found stone leaning and loose; plumbed and tamped about monument, leaving it in good condition. On south side are the letters "Pa." and "94 M."; on north side "N. Y."; under "N. Y." on the east half of north face is the letter "L."; on west half the letter "T." This stone marks the corners of the towns of Lindley and Tuscarora, in Steuben county, N. Y. Stands on north side of boundary line road about 275 feet east of the summit of ridge. On line between Samuel Morehouse and Edwin Baker.

Monument No. 230. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All four corners and edges slightly chipped; otherwise in

good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road and on east side of road running north and south. On line between A. S. Odle and Edward Thomas.

Monument No. 231. Mile-stone No. 95. Township Corner Stone.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All four corners chipped; otherwise in good condition. On south side are the letters "Pa."; under "Pa." on west half of south face is the letter "N."; on the east half of the same, the letter "L."; on north side "N. Y."; on east side "95 M." It marks the corners of the townships of Nelson and Lawrence in Tioga county, Pennsylvania. Stands on the north side of boundary line road under line of wire fence, and about 30 feet east of the southeast corner of the grove of pines, which is on a summit. On line between Wm. Price and Augustus Kango.

Monument No. 232. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners and edges chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of and at west end of boundary line road, at junction with road running north and south, and leading from Nelson to Addison; is 203 feet west of Monument No. 231. On line between Augustus Kango and Jerome Bottom.

Monument No. 233. Mile-stone No. 96.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "96 M." Stands on a gentle westerly slope at south side of woods at corner of wire fence, which runs east and south from stone. To find this stone go 1,354 feet east of Monument No. 234. On line between De Witt Baxter and Harry Baxter.

Monument No. 234. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All corners and edges badly chipped; otherwise in good

condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road running northerly from the village of Nelson; is on top of summit and on line with the south end of Baxter's barn. On the property of De Witt Baxter.

Monument No. 235. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road which is on the east bank of Baldwin's creek, and leads from Nelson to Addison. To find this stone go through fields back of De Witt Baxter's buildings. On line between Minbert Manley and Edwin Manley.

Monument No. 236. Mile-stone No. 97.

Made of granite, 5 x 6 inches, 16 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "97 M." Stands in a swamp at the bottom of a deep valley, about 525 feet west of Monument No. 235, and about 230 feet west of a brook under line wire fence, also north of woods. On line between De Witt Baxter and Minbert Manley.

Monument No. 237. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. Corners and edges slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of tracks of the Buffalo and Susquehanna railroad, about 42 feet south of a post painted white with "K. 85" on its south side. On the property of the Buffalo and Susquehanna railroad. Reset in 1904.

Monument No. 238. Mile-stone No. 98.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. All four corners and edges slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "98 M." Stands in a small cleared field on a southeasterly slope, somewhat grown up to brush. To reach this stone go east from Monument No. 239 along line stump

fence to top of summit; then follow wire fence down the hill through thick slashing covered with tree tops into a small open field on level land. Two feet south of wire fence, and 50 feet west of a chestnut tree with a branch grown by its side. On line between J. S. Cummings and Chas. Preston.

Monument No. 239. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. All edges and corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Elkland to Addison, about 300 feet south of summit. On line between J. S. Cummings and P. Tubbs.

Monument. No. 240. Mile-stone No. 99.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "99 M." Stands on steep westerly slope under line wire fence about 30 feet west of west edge of woods. To reach this stone go east from Monument No. 241. On line between H. D. Bates and the Patterson estate.

Monument No. 241. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Edges and corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of mail road leading from Elkland to Addison, about 10 feet southeast from large old chestnut tree, and about 500 feet north of bridge across brook. On line between H. D. Bates and the Patterson estate.

Monument No. 242. Mile-stone No. 100. Town Stone.

Made of granite, 6 x 6 inches, top 4 inches below surface of roadbed. Corners and edges badly chipped, as it stands in track of road leading from village of Elkland. On southwest side are the letters "Pa."; on northwest side "W."; on northeast side "T."; on southeast side "100 M." Marks corners of towns of Tuscarora and Woodhull, in Steuben county, N. Y. Is 100 feet

east of an iron bar which stands in bed of creek, 50 feet west of a native stone 18 inches above surface of ground, 18 inches wide and 5 inches thick; a cross is on top. Stands on north side of road close to board fence. On property of Mary and Sarah Durance.

Monument No. 243. Mile-stone No. 101.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "101 M." The northwest corner is broken, taking off the letter "Y" in "N. Y." Otherwise in good condition. Stands on north side of line board fence, south of orchard, 22 paces east of spring house, and is about 221 feet east of Monument No. 244. The old mile-stone lies on top of ground close to new stone. On line between Henry Tubbs and Mrs. C. M. Cilley.

Monument No. 244. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading southerly to Osceola, and about 100 feet southwest from Mrs. C. M. Cilley's house. On line between Henry Tubbs and Mrs. C. M. Cilley.

Monument No. 245. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Corners and north edge badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Camp brook road, about 75 feet west of barn, and about 50 feet southwest of Whitmore's house, both of which are on the east side of the road. On line between Jas. I. Whitmore and Henry Tubbs.

Monument No. 246. Mile-stone No. 102. Township Corner Stone.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On southeast side is the letter "O."; on southwest side "D."; on northwest side "N. Y."; on northeast side "102 M." Has diagonal grooves and marks the corners

of Osceola and Deerfield townships in Tioga county, Pa. Stands in a brush lot in level ground. To reach monument take private road east up a steep hill from A. A. Baker's house to an old barn; from barn go to southeast corner of cleared field; follow line wire fence east from clearing 40 paces to stone, which is 10 feet north of line fence. On line between E. R. Tubbs and A. A. Baker.

Monument No. 247. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners and north edge badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road at foot of steep westerly slope, about 500 feet southeast from A. A. Baker's house. On line between E. R. Tubbs and A. A. Baker.

Monument No. 248. Mile-stone No. 103.

Made of granite, 6 x 6 inches, 18 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "103 M." Stands in a cleared field at the foot of steep westerly slope, about 240 feet east of a brook and under line fence. On line between Mrs. E. Clark and E. and L. Gates.

Monument No. 249. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners and north edge badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Holden brook road, which leads northerly along the west bank of Clinton creek, and is about 200 feet west of brook; is east of Philip Kline's house. On line between Fred and A. Smith, and Robert Baker.

Monument No. 250. Mile-stone No. 104.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "104 M." Stands on easterly slope under line wire fence, just where a rail fence runs north from line, 568.6 feet west of Monument No. 249. On line between Baker and Humphrey.

Monument No. 251. Mile-stone No. 105.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "105 M." Stands on top of steep ridge, on the northeast side of summit, on level ground, among brush and logs; is 10 paces south of a small hemlock about 8 inches in diameter, and north of which is a small pine. To find this stone go in back of G. D. Bonham's buildings to line, then east up a steep bluff to the top; stone is on east edge of level land. On line between Chas. P. Calven and Simon Cady.

Monument No. 251-A. Highway Stone No. 1.

A steel I-beam, 5 x 3 inches, 12 inches above surface of the ground. In good condition. Has metal plates with "New York" on the north side and "Pennsylvania" on the south side. Stands on west side of Buckley brook road, at east end of line wire fence. On line between Geo. D. Bonham and Robert Sharp. Was set in 1904.

Monument No. 252. Mile-stone No. 106.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. On south side are the letters "Pa."; on north side "N. Y."; on east side "106 M." Stands on northwest side of an abandoned road on a northeasterly slope. To find stone go up hill past Sherwood Houghtling's house by an old road and follow left hand road. Stone is near road, about 20 feet west of a tall dead hemlock tree. On line between Sherwood Houghtling and Geo. Bonham.

Monument No. 253. Summit Stone.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands 1,103.3 feet west of Monument No. 252, on level ground, on the summit of a very high and steep hill, about 75 feet south of the northern edge of the summit, and directly south of a tall dead stub of a tree. To find this stone go up the steep hill from Monument No. 252. On line between Billings and Gardner.

Monument No. 254. Mile-stone No. 107.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Northwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "107 M." Stands under line wire fence, about 300 feet west of rail fence running northerly, 80 paces southeast of a pine tree which stands in cleared field, and about 100 feet north of line. Found this stone 25 inches above surface of ground, leaning and loose. We reset its top 6 inches above surface of ground. On line between Grove Hunt and Chas. M. Wood.

Monument No. 255. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 4 inches above surface of the ground. Northwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at east end of boundary line road and at south end of road running northerly; is 16.5 feet east of the corner of the towns of Woodhull and Troupsburg, in Steuben county, N. Y. On line between C. M. Wood and A. Gardner.

Monument No. 256. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. A piece is broken from south side; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side and at the west end of boundary line road. Report of 1903 says: "We were told that this stone was taken up some time ago and was reset east about 25 feet from its original position, and about 10 feet west of the driveway to Irving Jordan's house." On line between Irving Jordan and C. Jordan.

Monument No. 257. Mile-stone No. 108.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Southwest and northwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north "N. Y."; on east side "108 M." Stands under line wire fence, 1,061 feet west of Monument No. 256, in a cleared field on a steep southerly slope, and about 800 feet north of road running southwesterly. On line between Martin Jordan and Mrs. Lattimore.

Monument No. 258. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of a road leading from Austinburg to Knoxville, just east of creek. On property of R. P. Schooler.

Monument No. 259. Mile-stone No. 109.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "109 M." Stands in cleared field at west edge of a small knoll, north of Troup's creek, and 978 feet west of Monument No. 258; is under a rail fence, 8 paces east of a board fence running south, and 22 paces west of a black cherry tree which is on line; a thorn tree stands between cherry tree and stone. On line between H. Murdock and F. Murdock.

Monument No. 260. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. All four corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands about 150 feet north of bridge on west side of Troup's creek road, which leads from South Troupsburg to Austinburg. The stone, marked "1787, Penna. Lat. 42 degrees. Var. 1 degree 52 minutes west," lies on top of ground by the side of Monument No. 260. On property of H. B. Murdock.

Monument No. 261. Mile-stone No. 110.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "110 M." Stands in cleared fields, 2,141 feet west of Monument No. 260, on a southerly slope, between two small knolls; is north of line rail fence, about 350 feet northwest of iron bridge crossing Hillton creek, and directly north of old abandoned house. On line between Edward Murdock and Rhen Cowen.

Monument No. 262. Mile-stone No. 111.

Made of granite, 6 x 6 inches, 20 inches above surface of the ground. All corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "111 M." Stands near foot of a north-westerly slope of a high, steep hill, in cleared field, under line wire fence, about 100 feet south of woods, and about 30 feet southeast from small hickory tree. The report of 1901 gives this stone as standing 251 feet east of the corner of lots Nos. 100 and 101 in the town of Troupsburg, Steuben county, N. Y. To find this stone go up a steep hill through apple orchard, westerly from front of Westley's house. On line between Wm. G. Seely and E. Cady.

Monument No. 263. Mile-stone No. 112.

Made of granite, 6 x 6 inches, 7 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "112 M." Stands at south edge of woods, about 150 feet east of small ravine; is on south side of line rail fence, at junction of a rail fence running south, and about 1,000 feet north of road running parallel to boundary, into Pennsylvania. On line between Samuel Nodd and R. B. Boulio.

Monument No. 264. Mile-stone No. 113.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "113 M." Stands at north edge of thick woods on small knoll under line board fence, and about 15 feet west of a swampy brook. The report of 1901 gives this stone as being 174 feet west of the southwest corner of Lot No. 97 in the town of Troupsburg, Steuben county, N. Y. To find this stone go in back of H. W. Morton's house through cleared fields to stone. On line between H. W. Morton and Adam Loper.

Monument No. 265. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 13 inches above surface of the ground. Southwest and southeast corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north

side "N. Y." Stands north of woods, and on east side of road leading from Brookfield to Troupsburg. Found the earth ploughed away from this stone. We banked and tamped earth about stone, leaving it in good condition. On line between E. W. Miller and Edward Cady.

Monument No. 266. Mile-stone No. 114.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "114 M." Stands on top of steep southwesterly slope, 18 paces west of a fence running north, at the junction of which is a hickory tree. To find this stone go through fields up the hill and back of buildings that stand at junction of road. On line between U. C. Miller and W. W. Baker.

Monument No. 267. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 4 inches above surface of the ground. All four corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in wagon track of road leading north from Brookfield; is at the east end of a short piece of boundary line road. Mr. Geo. Simmons, supervisor of the township of Brookfield, told us he would protect this monument by setting large native stones on each side. On line between Ralph McCullough and Melvin Baker.

Monument No. 268. Mile-stone No. 115. County Stone.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On southeast side are the letters "T. Co."; on southwest side "P. Co."; on northeast side "115 M."; on northwest side "N. Y." Has diagonal grooves and marks corners of Potter and Tioga counties, Pa. Stands on a steep northwesterly slope about 100 feet west of the top of the hill, in line wire fence, 5 paces east of rail fence running north. An old original stone lies by its side, loose, on top of ground. On line between Chas. Gill and Ralph McCullough.

Monument No. 269. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading north from North Fork post-office; in a valley of an easterly and westerly slope. On line between Daniel Chase and Geo. Lewis.

Monument No. 270. Mile-stone No. 116.

Made of granite, 6 x 6 inches. We found this stone 20 inches above surface of ground, loose and leaning; reset its top 6 inches above surface of ground and in good condition. Northwest and northeast corners badly chipped. On south side are the letters "Pa."; on north side "N. Y."; on east side "116 M." Stands on steep westerly slope about 500 feet east of Monument No. 271, under line wire fence. On line between Geo. A. Carr and Wm. P. Chase.

Monument No. 271. Highway Stone No. 1.

Made of granite, 12 x 6 inches. The earth was away from this stone. We tamped and filled about stone and left in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading up the north fork of the Cowanesque river. Is on the property of Geo. A. Carr.

Monument No. 272. Town Stone.

Made of granite, 6 x 6 inches. Found stone 24 inches above surface of ground, leaning and very loose. We reset its top 4 inches above surface of ground and in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on easterly slope in cleared field, on south side of line fence, and about 800 feet west of Monument No. 271. Marks the towns of West Union and Troupsburg in Steuben county, N. Y. On line between Reuben Stiles, Geo. A. Carr and Nathan Allen.

Monument No. 273. Mile-stone No. 117.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. All corners slightly chipped; otherwise in good condition.

On south side are the letters "Pa."; on north side "N. Y."; on east side "117 M." Stands in open woods about 100 feet east of wood road and about 15 feet west of a maple tree, which serves as a fence post. To find stone follow wire fence east about 1,301 feet from Monument No. 274. On line between Walter Lathen and A. Saxton.

Monument No. 274. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 19 inches above surface of ground. Three corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on southeasterly slope in cleared fields, at east end of boundary line road. On line between Walter Lathen and A. Saxton.

Monument No. 275. Mile-stone No. 118.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "118 M." Stands in thick woods on a very steep northerly slope, about where the ridge slopes east and west, about 600 feet west of an abandoned road running north and south, about 400 feet east of clearing and about 500 feet south of creek; is 7 paces southwest of a beech, 12 inches in diameter (all trees blazed) and about 100 feet west of wire fence running north. Hard to find, as the woods are grown up to thick briars and brush. Did not get names of property owners.

Monument No. 276. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 20 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at north edge of woods, in line of an old pole fence just west of orchard, about 100 feet south of a small abandoned frame house, and about 200 feet east of the east end of an abandoned boundary line road. Is of no use as a highway stone. On line between Stetson and R. Smith.

Monument No. 277. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 18 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y." Stands at west end of a short piece of boundary line road in part of a stone fence, at southeast corner of a small building and on west side of road leading from Whitesville to Harrison Valley. On line between John Riley and Lee Smith.

Monument No. 278. Mile-stone No. 119.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "119 M." Stands 174.75 feet west of Monument No. 277, in a stone fence which covers the stone, and about 70 feet southwest from Smith Cornell's house. On line between John Riley, Horton and Shumway.

Monument No. 279. Section Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On southeast side are the letters "Pa."; on southwest side "E. T."; on northeast side "B. T." Has diagonal grooves and marks the southeast corner of the Ellis tract. Stands on level ground, 1,283.7 feet west of Monument No. 278, at west edge of woods under line wire fence. On line between John Riley, Horton and Shumway.

Monument No. 280. Mile-stone No. 120.

Made of granite, 6 x 6 inches, 2 inches above surface of ground. Has northeast and southeast corners broken off; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "120 M.", but the naught in "120" is gone. Stands about 147 feet west of the southwest corner of Lot 8 of the Ellis tract, upon a short easterly slope near the foot, about 250 feet west of a small brook, which crosses the line into New York and on the north edge of an open grove of maple and beech; is in line wire fence and about 150 feet west of wire fence running north. On line between Lavant Slocum and W. L. Warner.

Monument No. 280-A. Highway Stone.

Made of steel, 5 x 2½ inches, 24 inches above surface of the ground. In good condition. Has a metal plate, on south side of

which is the word "Pennsylvania" and on north side, "New York." Stands on west side of road leading from White's Corners to Whitesville, about 100 feet north of Horning's house. On line between Wm. Horning and H. Howard.

Monument No. 281. Mile-stone No. 121. Township Corner Stone.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On southwest side is the letter "B."; on southeast side "H."; on northwest side "N. Y."; on northeast side "121 M." Has diagonal grooves and marks corner of townships of Harrison and Bingham, in Potter county, Pa. Stands on level cleared land, on the summit west of Rosebrook valley, about 1,500 feet west of the brook, and in line board fence. To reach this stone go north of R. D. Cutler's buildings through cleared field keeping on ridge. An old original stone stands on west side of monument. On line between P. W. Lawrence and O. D. Hubbard.

Monument No. 282. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from White's Corners to Whitesville, 2,538.4 feet west of Monument No. 281. On line between P. W. Lawrence and R. B. Cutler.

Monument No. 283. Mile-stone No. 122.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "122 M." Stands in cleared field, on slight westerly slope, 48 paces west of small apple tree, which stands on line, and just north of line wire fence; is about 500 feet south of a grove of beech and maple trees. Northeast of Wm. Stafford's buildings. On property of P. W. Lawrence.

Monument No. 284. County Stone.

Made of granite, 6 x 6 inches, has diagonal grooves and stands level with ground. On southwest side are the letters "Pa."; on

northwest side "A. Co."; on northeast side "S. Co." All corners and edges are chipped; otherwise in good condition. Marks corners of Steuben and Allegany counties, N. Y. Stands on level ground, about 3 feet south of an old stone and rail fence, about 10 feet west of a rail fence running north and about 50 feet north of the most northerly of four apple trees, which stand at foot of low bluff, and 699.6 feet west of Monument No. 283, and northwest of Wm. Stafford's buildings. On line between Wm. Stafford and O. D. Hubbard.

Monument No. 285. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Spring Mills to North Bingham, and is about 10 feet east of a big black cherry tree on line. On property of Wm. Cobb.

Monument No. 286. Mile-stone No. 123.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "123 M." Stands on gentle westerly slope in cleared field, 273 feet west of Monument No. 285, and 3 paces east of a double cherry tree; is in brush growing along line. On property of Wm. Cobb.

Monument No. 287. Mile-stone No. 124.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. All corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "124 M." Stands in old stone wall, which has a rail top, 5 feet west of triple maples in a sumach grove walk, in from a big black cherry tree which stands on south side of road and on high bank above road. To reach stone go up a very steep hill, thence south about half a mile to line through cleared fields; is 44 paces west of board fence running southerly. On line between Vern, A. D. Howard and Lewis Allen.

Monument No. 288. Mile-stone No. 125.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. East edge and three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "125 M." Stands in clump of small beech and cherry trees, on a southwesterly slope, 1 foot north of line board fence, on south edge of woods, and about 1,000 feet north-east of Briggs' house. To reach this stone go in from C. P. Rixby's house, at a bend in road, thence through a sugar maple grove. An old original stone stands just west. On line between C. P. Rixby and M. G. Briggs.

Monument No. 289. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 20 inches above surface of the ground. Reset its top 6 inches above surface of ground, in good condition. Northwest corner chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Ainsworth creek road leading from Spring Mills south into Pennsylvania. Is 11 paces southeast from the southeast corner of U. S. cheese factory. On property of A. Bishop.

Monument No. 290. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road, about 500 feet east of Monument No. 291, and is on a high, steep bluff overlooking a valley on the south. On property of Anson Richmond.

Monument No. 291. Mile-stone No. 126.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "126 M." Stands on south side of boundary line road, about 15 feet north of northwest corner of Anson Richmond's barn. This stone serves as a highway stone as well as a mile-stone. On property of Anson Richmond.

Monument No. 292. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road, just where road turns to the south, and is about 5 feet east of large black cherry tree. On property of Geo. Hand.

Monument No. 293. Mile-stone No. 127. Town Stone.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On southeast side is the letter "B."; on southwest side "G."; on northwest side "N. Y."; on northeast side "127 M." Has diagonal grooves and marks corners of the townships of Bingham and Genesee, in Potter county, Pa. Stands in cleared open field, on steep northwesterly slope at north edge of thick briars, old tree tops and brush, 4 feet north of wire fence at a point where it turns to the southwest; about 50 feet northwest of a hemlock stub about 40 feet high, and about 200 feet east of thick woods in Pennsylvania. From this stone, looking into the valley, can be seen an ox bow in creek, about one-fourth of a mile distant. To reach this stone go south from Melvin Payne's buildings up steep hill through narrow strip of woods into the open field where stone is located. On property of Melvin Payne.

Monument No. 293½-A. Railroad Stone.

Made of gray sandstone, 6 x 6 inches, 6 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands about 3 feet west of the track of the New York & Pennsylvania R. R., about 800 feet southeasterly from railroad limit sign-board. To find this stone go northwesterly from depot in the village of Genesee.

Monument No. 294. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 4 inches above surface of the ground. Southwest corner badly broken; northwest corner and north side chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of Cryden creek road, about 25 feet southwest of the southwest

corner of Lee Foster's house. On line between Lee Foster and Wm. Cobb.

Monument No. 295. Mile-stone No. 128.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Northwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "128 M." Stands on slight southerly slope in cleared field, about 50 feet south of a wild cherry tree, about 50 feet east of a hemlock (nearly on line), 525.7 feet west of Monument No. 294, and about 300 feet west of a small brook. On property of John Pearce.

Monument No. 296. Railroad Stone No. 1.

A steel I-beam, 5 x 3 inches, 18 inches above surface of ground. In good condition. Has metal plates with the words "Pennsylvania" and "New York" inscribed, respectively, thereon. Stands in a ditch 4 feet 6 inches northeast of the most northerly rail of the Buffalo and Susquehanna railroad, and about 150 feet north of railroad bridge, at foot of a steep bluff.

Monument No. 297. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. Southwest and northwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in woods on east side of abandoned road, 6 paces southwest of a large birch tree, and northwest of a tall ironwood tree, both witnesses, and about 50 feet north of a very tall maple tree three feet in diameter. On line between Cobb estate and G. W. Pierce.

Monument No. 298. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Genesee Forks to Shongo, 20 feet east of large maple tree. On line between Cobb estate and G. W. Pierce.

Monument No. 299. Mile-stone No. 129.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "129 M." Stands in low brush, on a steep northeasterly slope, about two-thirds of the distance up the hill, and is 2 feet north of line board fence; is in line of telephone wire running east and west, and 1,180.3 feet west of Monument No. 298. On line between Patrick Kline and Arch Amidon.

Monument No. 300. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 24 inches above surface of the ground, leaning. Reset its top 10 inches above surface of ground, and in good condition. All corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from O'Donnell's Mills to the Irish settlement. On line between F. R. McHale and Patrick O'Hagen.

Monument No. 301. Mile-stone No. 130.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. Southeast corner broken off; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "130 M." The figure "1" in "130" is gone. Stands in cleared field about 90 paces east of private road leading to the residence of Bryan McGinnis, 2 feet south of an old stump fence, and 690 feet east of Monument No. 302. On line between Bryan McGinnis and Jas. O'Donnell.

Monument No. 302. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on northwest side of road leading to the Irish settlement, 690 feet west of Monument No. 301. On line between Jas. McGinnis and Jas. McHale.

Monument No. 303. Mile-stone No. 131.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Southwest corner chipped; otherwise in good condition.

On south side are the letters "Pa."; on north side "N. Y."; on east side "131 M." Stands in cultivated land, on slight southerly slope, about 2,000 feet north of road, 4 feet north of rail line fence, and 90 paces west of board fence running south; is north of a clump of beech trees. On line between Jas. O'Donnell and Mrs. J. McHale.

Monument No. 304. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of road leading to the Irish settlement, and at west end of a short piece of boundary line road. On line between Jas. Dwyer and Jas. O'Hara.

Monument No. 305. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Northwest and southwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands nearly in wagon track on east side of Ore Bed creek. On line between Jas. O'Hara and Patrick Hart.

Monument No. 306. Mile-stone No. 132.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "132 M." Stands about 770 feet west of Ore Bed creek, in cleared field, about 40 feet south of private road leading to Maxwell's house; is 5 feet west of a wire fence running south and 8 paces southwest of a basswood stump 22 inches in diameter. On property of Thos. Maxwell.

Monument No. 307. Highway Stone No. 1. Town Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Southwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; east half of north face is the letter "W."; on west half "A." Stands

on west side of road leading from Irish settlement, on the second ridge west of Monument No. 306, and on north side of line fence at short bend in fence. This monument marks corners of the towns of Alma and Willing, in Allegany county, N. Y.

Monument No. 308. Township Corner Stone No. 2.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On southeast side is the letter "G."; on southwest side "O."; on northwest side "N. Y." Has diagonal grooves and marks corners of the townships of Genesee and Oswayo, in Potter county, Pa. Stands on westerly slope, about 1,200 feet west of Monument No. 307, about 430 feet east of Monument No. 309, at north end of board fence going south.

Monument No. 309. Mile-stone No. 133.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "133 M." Stands on steep westerly slope in cleared land, under line board fence; is 426.6 feet east of Monument No. 310. On line between Wm. Burns and Edward Roach.

Monument No. 310. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in a valley on east side of road and at end of a stone and board fence. On line between Wm. Moran and John Moran.

Monument No. 311. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Wellsville to Coudersport; is in cleared land, and just north of a maple tree. On line between Peter Nolan and Thos. Hart.

Monument No. 312. Mile-stone No. 134.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y."; on east side "134 M." Stands in cleared land on level top of a knoll about 25 feet east of swampy ground near Red Water creek. Is 350 feet west of Monument No. 311 and 2 or 3 feet south of a rail fence. An old, original monument, bearing its inscriptions, is on the east side of, and near to this stone. On line between Patrick Markey and Peter Nolan.

Monument No. 313. Mile-stone No. 135.

Made of granite, 6 x 6 inches, 14 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "135 M." Stands on gentle northwesterly slope at forks of two wood-roads, one bearing northwesterly, the other southwesterly, Leave main road west of Mrs. Moore's house, follow old wood-road through cleared fields, then through thick brush patch to southwest corner of another cleared field, and thence west by an old road to stone. W. H. Moore, who is well acquainted with the location of this stone, assisted us in finding it. On line between John Tomany and Mrs. O'Brien.

Monument No. 314. Mile-stone No. 136.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "136 M." Stands on steep northwesterly slope, 950 feet east of a brook in deep ravine. To reach this stone, which is difficult to find, go up a steep hill from an old sawmill site which is in Crandall valley, take right-hand path, or old log road and follow same to stone, which is about 10 feet southeast of path, about 40 feet southwest of an old dead hemlock. Stands in thick briars, brush, from 3 to 15 feet high, and old dead tree tops. A swath should be cut from the valley to this stone. On line between Empire Gas Co., and Thos. Morrison.

Monument No. 315. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."

Stands on south side of road leading from Alma to the Irish settlement, about 100 feet east of W. H. Hogland's house. On property of W. H. Hogland.

Monument No. 316. Mile-stone No. 136½.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "136½ M." Stands at west edge of the original sixth latitude stone, in thick woods, on steep northeasterly slope, about 480 feet west of the south branch of Crandall creek. This monument was erroneously marked by the stonecutter "136½" miles. To find this stone, go west up steep hill from W. H. Hogland's buildings. Is on property of Bradley Gas Co.

Monument No. 317. Mile-stone No. 137.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "137 M." Stands in thick briars, brush, old logs and tree tops, just south of woods on a northwesterly slope, about 600 feet east of the top of the ridge, and about 2,000 feet west of Monument No. 316. Stone is 30 feet northeast of a maple about 14 inches in diameter, north of a maple 18 inches in diameter, and about 65 feet southwest of a very tall maple about 24 inches in diameter. All are blazed. The large maple stands on east edge of wood-road lately cut through by oil company. To find this stone cross bridge south of J. H. Hallett's buildings, then follow wood-road southerly, passing a large spring on east side of road. Trueman Pangburn can locate this stone. On property of Bradley Gas Co.

Monument No. 318. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading southerly from Alma post-office, 5 paces west of track of road and about 100 feet southeast of a tall hemlock. On line between John Shields and Jas. Shields.

Monument No. 319. Mile-stone No. 138.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "138 M." Stands on steep westerly slope, about 250 feet west of summit. About 50 feet west of an old wood-road, which runs north and south, a maple 2 inches in diameter about 12 feet east of road (witness) and about 6 feet southwest of a large blackened hemlock stump (witness), 4 feet west of a 2-inch poplar (witness). An old tree lying north and south, top of another log, and 3 feet west of stone. This stone is exactly parallel with a lane running south from Homer Elliott's barn on main road. Is 1,173 feet west of Monument No. 318. On line between Jas. Shields and Empire Gas & Fuel Co.

Monument No. 320. Town Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "H. P."; on east side "M. R." Stands at south side of a monument which was set in 1798 to mark the southeast corner of the Holland Land Company's purchase. The north edge of the new monument indicates the line. Stands upon steep northeasterly slope, about 600 feet west of a deep ravine, and about 20 feet north of a narrow path leading up the hill. This stone marks the corners of the towns of Bolivar and Alma, in Allegany county, N. Y. To reach stone take wood-road back of E. N. Whipple's house and follow town line fence. On line between Homer Elliott and Mushrow estate.

Monument No. 321. Mile-stone No. 139.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "139 M." Stands on a steep northerly slope, about 500 feet south of where slope begins to descend very rapidly, about 150 feet north of the summit, 30 feet north of a group of maples, and is 1,148.6 feet west of Monument No. 320. There are small trees about stone which are blazed. To find this stone, go west along the edge of summit from

Monument No. 320 opposite to where creek runs in an "S" shape. On line between Wm. Hyatt and Newel Whipple.

Monument No. 322. Township Corner Stone No. 1.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On southwest side is the letter "S."; on southeast side "O."; on northwest side "N. Y."; has diagonal grooves and marks the corners of the townships of Oswayo and Sharon, in Potter county, Pa. Is 614 feet east of the southwest corner of section 1, Township 1, of the Holland Company's purchase, and stands on a northwesterly slope, 21 paces west of a large birch, 7 paces east of a maple, 18 inches in diameter, 6 feet north of line wire fence, about 50 feet north of an old road running east and west, and is 1,800 feet east of Monument No. 323. On line between Empire Gas & Fuel Co., and John Gadsby.

Monument No. 323. Highway Stone No. 1.

Made of granite, 12 x 6 inches, level with the surface of the ground. All corners and edges are chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of a private road which runs south of a road leading from Alma to South Bolivar, at the point where it turns to follow boundary to the east. On line between Wm. Hyatt and Elizabeth Hogan.

Monument No. 324. Mile-stone No. 140.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "140 M." Stands in open woods at foot of steep northerly slope, about 10 feet above level of a swamp. Is 782.5 feet west of Monument No. 323 and under line wire fence, about 75 feet east of a large pile of sawdust. On line between Gilbert Chaple and W. T. Lewis.

Monument No. 325. River Stone.

Made of steel, 5 x 2 inches, 24 inches above surface of the ground. In good condition. On south side is a metal plate

bearing the inscription "Pennsylvania" and on the north side one bearing the inscription "New York." Stands in open field about 150 feet north of Honeoye creek, 6 paces southeast of a birch tree, 21 feet northeast of a large hemlock trunk (limbs about 8 feet from ground), and about 20 feet south of a rail fence. On property of Ezekiel Griffith.

Monument No. 326. Mile-stone No. 141.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "141 M." Stands in cleared fields on level land, 2 feet north of line stump fence, 1,148.3 feet east of Monument No. 327. On line between Geo. Yeakel and Croger's estate.

Monument No. 327. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. All corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on southeast side of a road leading from South Bolivar to Shinglehouse, and is 12 paces northwest of A. F. Smith's barn. On line between Nathan Wayward and A. F. Smith.

Monument No. 328. Mile-stone No. 142. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "142 M." Stands on west side of a road leading from Goldsmith's Corners. On line between H. Birdie and Mrs. Blakely.

Monument No. 329. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road (little used) under board fence, which is about 15 feet north of a brook;

is about 500 feet northwest of an old abandoned house, nearly in front of which is an evergreen tree. On line between O. B. Stillman and the Willet estate.

Monument No. 330. Mile-stone No. 143.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; under the latter "143 M." Stands among small saplings and light underbrush on a very steep southerly slope, about 200 feet south of summit of ridge, where a steep westerly slope begins. Is 10 feet south of three fallen logs, and about 25 feet northeast of a black stump which has native stones piled on its top. To find this stone, go east from Monument No. 331 up to top of hill. Very hard to find. On property of Seth Drake.

Monument No. 331. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on bank close to a board fence on east side of road leading from East Sharon to Bolivar. A steep hill is east of stone. On line between Charles Burbank and L. D. Applebee.

Monument No. 332. Mile-stone No. 144.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa." and "144 M."; on north side "N. Y." Stands on north side of private road, following the boundary line, about 370 feet west of a small brook, and is also east of a church. This private road leads to Thomas Wolcott's house. On line between Thos. Wolcott and L. P. Perry.

Monument No. 333. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 18 inches above surface of the ground, leaning quite badly. Reset its top 10 inches above surface of ground and in good condition. All corners chipped. On south

side are the letters "Pa."; on north side "N. Y." Stands on east side of main road leading from Bolivar to Shinglehouse, at west end of a private road, and about 100 feet southeast of Horse Run M. E. church. On line between L. P. Perry and Mrs. Wolcott.

Monument No. 334. Mile-stone No. 145.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Northwest and southwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "145 M." Stands on westerly slope 271 feet east of Monument No. 335, on north edge of low thick brush, and about 1 foot south of line board fence. On line between Geo. Sherwood and Abraham Solomon.

Monument No. 335. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Little Genesee to Shinglehouse, and east of fence running north and south. On line between Geo. Sherwood and Abraham Solomon.

Monument No. 336. County Stone.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On southeast side are the letters "P. Co."; on southwest side "McK. Co."; on northwest side "N. Y." Has diagonal grooves, and marks corners of Potter and McKean counties, Pa. Stands on a steep northwesterly slope, 1,416.6 feet east of Monument No. 337, 913.5 feet west of the northwest corner of a Pennsylvania Warrant No. 4330, 6 feet north of a large black stump and about 200 feet north of a tall chestnut tree which is 2 feet in diameter; is in thick woods about 200 feet east of a gas pipe line, running up hill, about 300 feet south of gas well and about 25 feet north of brow of hill. On line between C. B. Sherwood and Frank Van Wormer. This stone is hard to find.

Monument No. 337. Mile-stone No. 146.

A steel I-beam, 5 x 3 inches, 18 inches above surface of ground. Has metal plates with the words "Pennsylvania" and "New York" inscribed thereon, and "146 Miles" on east side. In good condition. Stands in a patch of low briars, timber all cut; is nearly on top of a steep westerly slope about 575 feet east of a brook in a deep ravine, about 25 feet north of a large black hemlock stump, and stands nearly in an old log road going down the hill to the west. On line between Geo. Case and the York estate. Was set in 1904.

Monument No. 338. Mile-stone No. 147.

Made of granite, 6 x 6 inches, 7 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "147 M." Stands in a swampy place in open woods, about 150 feet east of the west end of line wire fence, which follows in from Monument No. 339, about 8 feet south of a large pine stump, about 50 feet northeast of a tall oak stub, about 100 feet south of a wood-road which is nearly parallel with line, and is also about 100 feet west of a small brook. On line between L. J. Carrier and C. G. Chandler.

Monument No. 339. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 13 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of a road leading from Myrtle to Little Genesee, 10 paces west of trolley road and about 1,000 feet south of trolley power-house. On line between Geo. Case and Geo. Chamberlain.

Monument No. 340. Mile-stone No. 148.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. All corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "148 M." Stands in cultivated field, about 500 feet east of the New York and Pennsylvania railroad, north of small hay barn which stands near tracks of the railroad, and 500 feet

west of old stump fence. A granite stone, 6 x 6 inches, and 24 inches high, and bearing no inscription, stands near mile-stone. On property of B. E. & C. R. R. Co., which road was abandoned long ago.

Monument No. 341. Railroad Stone No. 1.

Made of granite, 6 x 6 inches. Report of 1903 says: "Stands 6 inches above surface of ground; all corners are badly chipped. On south side are the letters 'Pa.'; on north side 'N. Y.' Stands in village of Ceres, about 15 feet south of the southerly track of the Pittsburg, Shawmut and Northern railroad, at the foot of the embankment, about 300 feet west of an old mill dam and 800 feet east of Monument No. 342. It is on the property of the Pittsburg, Shawmut and Northern Railroad."

Within the past three years the railroad company has raised the southerly track extending their embankment, covering stone. Therefore we did not find it. On property of Pittsburg, Shawmut and Northern railroad.

Monument No. 342. Highway Stone No. 1.

Made of granite, 12 x 6 inches, top level with surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of Union street in the village of Ceres, near the corner of M. A. North's shoe store. On property of M. A. North.

Monument No. 343. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Northwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of Olean street in the village of Ceres, at northeast corner of a cemetery in Pennsylvania. On property of Chas. Bell.

Monument No. 344. Mile-stone No. 149. Highway Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters

"Pa."; on north side "N. Y." and "149 M." Stands on south side of Olean street in the village of Ceres, a little south of a stump fence, and also south of the Empire school building, in Genesee, N. Y., which is 100 feet west of cemetery. On property of Chas. Bell.

Monument No. 345. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of Olean street in the village of Ceres, and about 500 feet southeast of glass works. On property of A. Maxson.

Monument No. 346. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. On south side are the letters "Pa."; on north side "N. Y." Stands about 100 feet south of the Pittsburg, Shawmut and Northern railroad, in cleared field and in line of telephone poles. On property of the old B. E. & C. R. R. Co.

Monument No. 347. Mile-stone No. 150.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "150 M." Stands in low swampy ground, about 500 feet due south of V. P. Carter's large barn, about 25 feet in the north edge of large timber, and 175 feet east of the corner of Sections 49 and 57. A small growth of saplings is on the north, and stone stands in Township 1, Range 2, of the Holland Land Company's purchase. To reach stone, go in from railroad past barn of V. P. Carter. On line between V. P. Carter and Wm. King.

Monument No. 348. River Stone No. 1.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters

"Pa."; on north side "N. Y." Stands 12 paces east of Oswayo creek, about 4 feet north of wire fence. A small narrow strip of meadow land comes west to creek. Is 6 feet north of a cluster of eight beech trees, standing in a radius of six feet. On line between F. T. Barber and Byron Langworthy.

Monument No. 349. County Stone No. 1.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. All corners and southwest edge badly chipped; otherwise in good condition. On southwest side are the letters "Pa."; on northwest side "C. Co."; on northeast side "A. Co." Has diagonal grooves and marks the corners of Allegany and Cattaraugus counties, N. Y. Stands in scattering timber and swampy ground, about 15 feet southwest of an elm tree, with a vine growing about it. On line between W. E. Hornblower and A. Worden.

Monument No. 350. Mile-stone No. -151.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. Southeast and northeast corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "151 M." Stands 8 paces south of south bank of Oswayo creek, about 15 feet west of a large pine stump, and about 10 feet east of a smaller pine stump. Is about 1,000 feet west of Monument No. 349, and is on line between W. E. Hornblower and Edward Woodruff.

Monument No. 351. Highway Stone No. 1.

Made of granite 12 x 6 inches, 12 inches above surface of the ground. Southeast, southwest and northwest corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Portville to Ceres. On line between T. F. Baker and J. P. Remington.

Monument No. 352. Mile-stone No. 152.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. Southeast and northwest corners chipped; otherwise in

good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "152 M." Stands in open scattered woods, upon steep northerly slope, among tall maple and beech trees and just south of a clump of hemlocks. Is on a slight knoll which slopes east and west from stone, and about 850 feet east of the summit of a high ridge between the valleys of the Oswayo and Allegheny. To find this stone, go north of M. J. Skiver's buildings, up steep hill, keeping on ridge that slopes east and west. On line between M. J. Skiver and Mrs. H. Kahoe.

Monument No. 353. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 18 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on southwest side of a road leading from Portville to Bullis Mills, opposite Love's house. On line between Emery Skiver and Mayland Smith.

Monument No. 354. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 16 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in cleared land, about 150 feet west of Monument No. 353, in line fence near the old road bed of the B. E. & C. R. R. Is of no use as a railroad stone.

Monument No. 355. Railroad Stone No. 2.

Made of granite, 6 x 6 inches, top 6 inches below railroad bed. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands about 4 feet northeast of the track of the Pennsylvania railroad, 2 feet west of a post with sign on it, on which are: "McK. Co." and "Cattaraugus"; also "New York" and "Pennsylvania."

Monument No. 356. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Three corners chipped; otherwise in good condition.

On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Bullis Mills to Pine Grove. On line between Stetson and Smith.

Monument No. 357. Mile-stone No. 153.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "153 M." Stands in a narrow dyke between the Allegheny river and slough flood water channel. Is in open wood about 30 feet west of left bank of the river, and about 7 feet northwest of a pine stump; is also 4 feet southeast of a blackened pine stump, under a line log and timber fence, and about 300 feet north of Bullis Mills, across the river.

Monument No. 358. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. Northeast and southeast corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Portville to Eldred. On line between Chas. Armstrong and Jerome Fowler.

Monument No. 359. Mile-stone No. 154.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "154 M." Stands in a ravine 9 paces east of a brook and on south edge of woods. To reach stone, follow line wire fence from monument No. 358 over a high steep hill to west end of fence, where stone is located. There is a path all the way to stone. On line between Mrs. E. A. Burnham and Hostetter estate.

Monument No. 359-A. Highway Stone.

Made of steel, 12 inches above surface of ground. In good condition. On south side is a plate with the word "Pennsylvania" and on north side one with "New York." Stands on west side of road leading up Knapp's creek at south edge of woods and is about 54 feet east of Monument No. 360.

Monument No. 360. Town Stone No. 1.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On northeast side is the letter "P."; on the northwest side "O."; on southwest side "Pa." Has diagonal grooves and marks the corners of the towns of Portville and Olean, in Cattaraugus county, N. Y. Stands on gentle easterly slope, twenty paces west of Monument No. 359-A, and just on edge of a briar patch on north edge of woods. On line between Dusenberry and Wheeler.

Monument No. 361. Mile-stone No. 155.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "155 M." Stands in open woods on steep easterly slope, about 600 feet east of the summit of the ridge; is west of valley, and about thirteen feet north of brush fence. The trees within fifty feet of stone bear witness marks, and are chiefly large beech trees. On line between Dusenberry, Wheeler and the South Pennsylvania Oil Co.

Monument No. 362. Mile-stone No. 156.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "156 M." Stands in growth of small timber, about 20 feet east of an upturned root on which there is little earth. Stands in a wet spot about 54 feet west of a wood-road and 845 feet east of Monument No. 363. Is about 120 feet southwest of a pumping station. An old original stone stands near this monument 18 inches out of ground. On line between Dusenberry, Wheeler and South Pennsylvania Oil Co.

Monument No. 363. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Benton's Mills to Haymaker, also to Eldred. Is in a valley, south of South Penn. water-station. On line between Wheeler and South Penn. Oil Co.

Monument No. 364. Mile-stone No. 157.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "157 M." Stands on steep northeasterly slope in scattered timber of beech and maple, about 250 feet northeast of Keating oil well No. 26, near top of hill, and 200 feet north of road from a point about 200 feet east of this well, which is near the road. To find this stone, go up road from valley to oil well No. 26. On line of South Penn. Oil Co.

Monument No. 365. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Rock City to Eldred. Found this stone leaning badly, the west edge exposed 36 inches, and 12 inches on east edge. We removed stone, also porcelain plate, and dug deeper, then by cross-lines and plumb, we reset plate, then by same lines reset stone, its top 10 inches above ground and in good condition. On line between A. W. Dodge and W. Mersereau.

Monument No. 366. Mile-stone No. 158.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "158 M." Stands on southeasterly slope of a brook flowing northeasterly; follow up this creek in ravine to remains of an oil derrick which is on edge of south bank and about 100 feet south of stone. A large shaggy birch tree stands in bottom of ravine. A tall beech tree stands on north side of stream and about 100 feet northeast down the creek from birch tree. The stone is about 75 feet northwesterly from beech tree. Is 1,593 feet west of Monument No. 365 and about 1,200 feet west of north branch of Indian creek, which flows east of Mrs. Dodge's buildings. To reach this stone go southwesterly from Mrs. Bertha Dodge's house. On line between A. A. Mersereau and Mrs. Bertha Dodge. Very hard to find.

Monument No. 367. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Southeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on southeast side of woods on easterly slope, and on east side of road which leads north from the hamlet of Wigam, but which is now little used. On the property of Miles Loop.

Monument No. 368. Township Corner Stone.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On southeast side is the letter "E."; on southwest side "O."; on northwest side "N. Y." Has diagonal grooves and marks corners of townships of Otto and Eldred, in Pennsylvania. Stands near top of bluff on steep northeasterly slope, in growth of small trees, about 20 feet northwest of a road leading up the hill and nearly parallel to line. Is about 200 feet west of Monument No. 367. On line between H. Boulton and F. Newman.

Monument No. 369. Mile-stone No. 159.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "159 M." Stands on gentle southerly slope in a clump of 10-inch hemlocks, about 200 feet northeast of the derrick of Richard Rote, and about 15 feet east of a small, swampy stream running south. To find this stone go along road 88 paces west of Rote's house, then north about 350 feet, following small, swampy stream. On line between D. E. Quinlan and Lewis Loop estate.

Monument No. 370. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands near creek on the south side of road leading from Wigam to Knapp Creek station, about 25 feet southeast of a bushy pine tree. Road west of monument not much used. On line between D. E. Quinlan and Lewis Loop estate.

Monument No. 371. Mile-stone No. 160.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. Southwest and northeast corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "160 M." The naught in "160" is broken off. Stands in thick woods on northerly slope, about 250 feet directly south of derrick No. 9 of the Bradford Oil Co., and about 700 feet east of the most easterly one of three very large rocks, nearly on line. It is near the summit of ridge, and about 8 feet north of a maple with rotten side; also 1,333 feet east of Monument No. 372; on property of South Penn. Oil Co. Very hard to find.

Monument No. 372. Highway Stone No. 1.

Made of granite, 12 x 6 inches. All corners and edges badly chipped. On south side are the letters "Pa."; on north side "N. Y." Found the earth scraped away from the west side 36 inches, stone was plumb. Set cross-lines by cross on top of stone, then removed stone. Found no porcelain plate. Could not dig any deeper, as the monument stood on solid, hard rock. Reset stone two feet east in bank on state line in order to place it away from ditch at side of road. Its top is 12 inches above surface of ground, and in good condition. On property of South Penn. Oil Co.

Monument No. 373. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Knapp Creek station to Moretown. Found the earth scraped away from west side of stone 22 inches. The stone is 6 feet east of wagon-track of road. We made a wall of native stone and banked it up with earth, its top 12 inches above surface of ground in good condition. On line between Angel Oil Co., and tract of Barse estate.

Monument No. 374. Mile-stone No. 161.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y."; on east side "161 M." Stands on westerly slope, surrounded by bushes, 4 feet south of a blazed stump, and 93.85 feet west of Monument No. 373. On line between Angel Oil Co., and tract of Barse estate.

Monument No. 375. Trolley Line Stone.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of track of the Olean, Rock City and Bradford Electric railroad. Is about 100 feet south of an old railroad depot. On property of electric railroad.

Monument No. 376. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of main road leading from Bradford to Olean, about 200 feet south of intersection of main road with road leading from State Line station, and is about 1,000 feet west of Monument No. 375. On line between Wm. Meachin and Mrs. M. Smiley.

Monument No. 377. Mile-stone No. 162.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "162 M." Stands in woods on gentle southerly slope, about 100 feet northeast of a derrick (no number on same) of South Penn. Oil Co., and up very high, steep bluff, about 490 feet west of Pembroke run. (No pipe line here.) A very tall maple is east of derrick, also beech and maple timber. On line between South Penn. Oil Co., and Mrs. M. Smiley. Hard to find.

Monument No. 378. Township Corner Stone.

Made of granite, 6 x 6 inches, 7 inches above surface of the ground. In good condition. On southeast side is the letter "O."; on southwest side "B."; on northwest side "N. Y." Stands in thick, young woods on southerly slope, about 400 feet southeasterly

of a derrick (no number) of the Angel Oil Co., and 2,354 feet west of Monument No. 377. This stone has diagonal grooves, and marks corners of townships of Otto and Bradford, in McKean county, Pa. To reach this stone go in from the Bradford and Olean road, taking first old wood-road east of a school house, which runs southerly to oil well No. 3 on the hill, thence about 100 feet west of derrick. On line between Angel Oil Co., and E. T. Johnson. Hard to find.

Monument No. 379. Mile-stone No. 163.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "163 M." Stands in thick, young woods on level ground, and on top of ridge about 100 feet south of derrick No. 3 of the Jones & Blackman Oil Co. Is 10 paces west of a hemlock, 20 inches in diameter, and 300 feet south of residence of M. P. Weaver, is also south of Armstrong's house on main road. On line between J. T. Jones and E. T. Johnson.

Monument No. 379-A. Highway Stone No. 1.

Made of steel, 5 x 2 inches, 20 inches above surface of the ground. In good condition. Has metal plates with "New York" and "Pennsylvania" inscribed, respectively, thereon. Stands on east side of Harrisburg run road leading from Knapp Creek to Bradford; is about 5 feet north of a large hemlock, and about 1,420 feet east of Monument No. 380.

Monument No. 380. Mile-stone No. 164.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; east side "164 M." Stands in open space in woods, about 300 feet northwest of H. H. Argue's derrick No. 90, which is the first derrick on west side of road after leaving Monument No. 379-A, and is about 100 feet west of road. To reach stone, cross creek at derrick and go to a point about 100 feet east of two hemlock trees, which are low and bushy. This stone is 7 chains 79 links east of the southwest corner of Lot 1, Sec. 13,

of Township 1, Range 5 of the Holland Land Company's purchase. On tract of Clark Babcock and Huland.

Monument No. 381. Mile-stone No. 165.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "165 M." Stands in thick, open woods on steep, westerly slope, about 125 feet west of summit, about 75 feet east of tall chestnut stub and about 100 feet east of a tall burned pine stub. To find this stone go east from Monument No. 382 by old wood-road to derrick No. 8, thence east by a road passing derrick No. 7. Stone is about 195 feet south of derrick No. 6 and about 100 feet south of an old wood-road. Very hard to find. On property of Enterprise Transit Oil Co.

Monument No. 382. Mile-stone No. 166.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." and "166 M." Stands on south side of old abandoned state line road about 165 feet west of small brook, and 7 paces south of road, about 500 feet west of an old sawmill site. On property of Enterprise Transit Oil Co.

Monument No. 383. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. All corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of private road running on state line; is under wire fence and south of the east side of an apple orchard of young trees. Is about 700 feet east of Monument No. 384. On line between J. E. Eckhart and McCray estate.

Monument No. 384. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in valley of Tuna creek on west side of road leading from Limestone to Bradford. On line between J. E. Eckhart and Herman Beardsley.

Monument No. 385. Railroad Stone No. 1.

A steel I-beam 5 x 3, top level with top of railroad rail. Has metal plates with "Pennsylvania" and "New York" inscribed, respectively, thereon. It stands between the two tracks of the Buffalo, Rochester and Pittsburg railroad, in Tuna valley, 3 feet 3 inches west of the westerly rail of easterly track.

Monument No. 386. Railroad Stone No. 2.

A steel I-beam, 5 x 3 inches, top 5 inches above top of railroad rails. Has metal plates with "Pennsylvania" and "New York" inscribed, respectively, thereon. It stands 3 feet 5 inches east of the easterly rail of the Erie R. R., in Tuna valley, 20 feet 3 inches west of north from a square post painted white with the figure "8" on two sides.

Monument No. 387. Mile-stone No. 167.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "167 M." Stands in cleared land and marshy ground, in line wire fence and 139 feet west of Monument No. 386.

Monument No. 388. Mile-stone No. 167 1/10.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "167 1/10". Stands upon Tuna flats at east edge of seventh latitude stone, and on north side of line wire fence. Is about 250 feet west of Tunaunguant creek and west of an alder bog.

Monument No. 389. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. Three corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of a road leading from Limestone to Bradford, which is on the west side of Tuna Valley creek. On line between Wm. Beardsley and Phoebe Carpenter.

Monument No. 390. Mile-stone No. 168.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "168 M." Stands in thick, small timber, under line wire fence on very steep northeasterly slope, and about 10 feet west of old maple stump. To reach stone, follow fence from Monument No. 389. On line between Wm. Beardsley and Freely.

Monument No. 391. Mile-stone No. 169.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "169 M." Stands in thick, open woods upon gentle southwesterly slope in quite heavy timber, and about 100 feet west of summit of ridge, and also about 865 feet west of west side of summit of main ridge. Trees near stone are blazed, and three or four have fallen and lie near stone. On line between Bingham estate and Bradford Land Co. Very hard to find.

Monument No. 392. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on southwesterly slope on east side of abandoned wood-road, which follows the valley of Bolivar brook. Is of no use as a highway stone. On line between Bingham estate and Bradford Land Co.

Monument No. 393. Mile-stone No. 170.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "170 M." Stands on west edge of a swampy spot, in partially cleared space of thick woods, upon very steep easterly slope and about 650 feet west of Monument No. 392. On line between Limestone Tannery Co., and Bradford Land Co.

Monument No. 394. Holland Land Company's Purchase.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On southwest side are the letters "Pa."; on northwest side "S. 66"; on northeast side "S. 54." Has diagonal grooves and marks corners of sections 54 and 66 of Township 1, Range 6, of Holland Company's Purchase. Stands in thick, open woods in heavy timber mostly beech and maple; on gentle easterly slope 485 feet west of Monument No. 393, and 51 paces east of a gas pipe-line running north and south over summit into Bradford. Line is buried 12 inches. Stone is on line between Limestone Tannery Co., and Bradford Land Co.

Monument No. 395. Holland Land Company's Purchase. Town Stone.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On southwest side are the letters "Pa."; on northwest side "R. H."; on northeast side "C." Has diagonal grooves; set at the south end of western transit meridian of the Holland Land Company's Purchase, and marks corners of the towns of Carrollton and Red House, in Cattaraugus county, N. Y. Stands in thick, open woods, on nearly level ground, 5 feet west of a large, upturned root, and nearly under a fallen log. Stands in a stone pile 27 paces west of old transit hub and about 40 feet east of a tall, shaggy maple stub. On line between Limestone Tannery Co., and Bradford Land Co.

Monument No. 396. Mile-stone No. 171.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "171 M." Stands in thick briars on level ground and among rather scattering beech and maple timber; a blazed tree is partly broken off about 8 feet from ground, and has fallen over on top of another tree, and lies at an angle of 45 degrees. Stone is 548.4 feet west of Monument No. 395. On property of Bradford Land Co.

Monument No. 397. Mile-stone No. 172.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. Corners chipped; otherwise in good condition. On south

side are the letters "Pa."; on north side "N. Y."; on east side "172 M." Stands on gentle southwesterly slope in cleared space, 200 feet west and 150 feet north of woods, and about 40 feet west of where hill starts to slope sharply to the east. Is in thick woods, about 25 feet east of a big, blackened stump, about 800 feet east of Monument No. 398, and 500 feet southwest of a spring where a green live hemlock, which can be seen for a long distance, stands. On property of Bradford Land Co.

Monument No. 398. Highway stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Southwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on top of summit on level land in low brush and briars, about 300 feet southeast of a large chestnut stub (three or four old saw logs near by) and 800 feet west of Monument No. 397. On property of Bradford Land Co. There are no signs left of the old Bradford Trail.

Monument No. 399. Holland Land Company's Purchase.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On southwest side are the letters "Pa."; on northwest side "H. L. Co."; on northeast side "W. J. W." Has diagonal grooves, and marks corner of the Willink strip No. 47. Stands in burned woods surrounded by briars, about 50 feet south of a path or old wood-road and about 40 feet southeast of an old, burned stub 12 feet high. Is about 400 feet south of a tall stub, and 1,539 feet west of Monument No. 398. Stands on level land between E. R. Schoonmaker and Bradford Land Co.

• *Monument No. 400. Mile-stone No. 173.*

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "173 M." Stands on level ground southwest of gentle slope and northwest of Red House creek, about 1,000 feet north of abandoned lumber camp on Red House creek, which is known as "Cass Duell's old shanties," traces of which can still be seen. Stone stands between two large blackened blazed stumps, southwest of a large hemlock stub, by the

side of which is a small pine stub. There is no live timber here, but loose stones and rocks cover the ground, which has grown up to briars. Stone is 500 feet northeast of two very tall stubs. On property of Bradford Land Co.

Monument No. 401. Holland Land Company's Purchase. Three-Mile Post.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "N. Y."; on north side "Pa."; on east side "3 M. P." Stands on steep northerly slope in thick woods, about 75 feet from brow of hill which slopes westerly, and about 350 feet southwest of a deserted lumber camp, at which place a hunter's shanty has recently been built. Stands 20 feet west of large soft maple; upon south line of Township 1, Range 7, of the Holland Land Company's Purchase, and about 260 feet west of corners of sections 25 and 33 of Township 1, Range 7. The letters "N. Y." and "Pa." were erroneously cut on this stone. On line between Bradford Land Company and Stone estate.

Monument No. 402. Mile-stone No. 174.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "174 M." Stands in thick and very large briars in open woods on northerly slope at northeast side of a large root of a hemlock tree which has fallen to the north; is 275 feet west of where the abandoned Allegheny and Kinzua railroad crosses line, and is 1,052 feet west of Monument No. 401. On property of Bradford Land Company. Very hard to find.

Monument No. 403. Mile-stone No. 175.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "175 M." Stands on southerly slope in cleared space, 800 feet northeast of what remains of Yager's old sawmill, about 300 feet north of Quaker run, and about 12 feet south of abandoned road which parallels line running easterly. Is 1,555.2 feet east of Monument No. 404 and about

1,072 feet east of corners of sections 41 and 49, Township 1, Range 7 of Holland Land Company's Purchase. A very steep southerly slope is north of stone, which is about due north from most easterly building of the buildings of old sawmill. On property of Bradford Land Company.

Monument No. 404. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in very thick woods on west side of abandoned log-road which is covered with briars; is 52 paces west of a good trout stream, 500 feet west of Yager's old sawmill, and about 60 feet west of old wooden trough which was made to float lumber in. Is of no use as a highway stone. On property of Bradford Land Company.

Monument No. 405. Mile-stone No. 176.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Corners slightly chipped. On south side are the letters "Pa."; on north side "N. Y."; on east side "176 M." Stands on very steep southerly slope in beech woods, 300 feet south of summit of ridge, and about 1,300 feet west of brow of slope where it intersects boundary line. Is 268 feet west of southeast corner of section 57, in Township 1, Range 7, of the Holland Land Company's Purchase. Stone is on a level place or table, which is about 30 feet long and 20 feet wide, and on the south side of which begins a very sharp and steep slope. On property of Bradford Land Company.

Monument No. 406. Holland Land Company's Purchase. Mile-Post 5½.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "5½ M. P." Stands on steep westerly slope in thick woods, on narrow terrace, 9 feet south of a tall dead hemlock, which has its bark peeled off 4 feet from ground; is about 200 feet from foot of slope and 1,141 feet west of Monument No. 405; is also 25 feet southeast of an ash tree about

24 inches in diameter. Very difficult to find. On property of Bradford Land Company.

Monument No. 407. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. All corners badly chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of good road leading northerly to Frenches on south branch of Quaker run and north of schoolhouse. On property of Bradford Land Company.

Monument No. 408. Mile-stone No. 177.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. Three corners chipped. On south side are the letters "Pa."; on north side "N. Y."; on east side "177 M." Stands in open woods on slight easterly slope, about 6 feet south of a brook, about 25 feet south of old wood-road and 455.6 feet west of Monument No. 407. On property of Bradford Land Company.

Monument No. 409. Town Stone No. 1.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On southwest side are the letters "Pa."; on northwest side "S. V."; on northeast side "R. H." Has diagonal grooves and marks corners of towns of South Valley and Red House, in Cattaraugus county, N. Y. Stands in open woods on steep northerly slope on south side of narrow ravine, and is about 15 feet south of a brook running westerly. An ash tree that has fallen in the direction in which ravine runs, and which is crossed by another tree, is about 20 feet north of stone; stone is 600 feet west of Monument No. 408 and 2,753 feet east of Monument No. 410. On property of Bradford Land Company.

Monument No. 410. Mile-stone No. 178.

Made of granite, 6 x 6 inches, 7 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "178 M." Stands on top of a northwesterly slope in a clearing just at edge of slope and east of valley of Wolf run; is about 165 feet west of a large maple which stands below brow of hill; 1,170 feet west of west branch of Quaker run, and is about 55 feet north of three blackened logs. On property of Bradford Land Company.

Monument No. 411. Mile-stone No. 179.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "179 M." Stands in burnt woods on level ground, on north bank of shallow ravine in which runs a brook, and is 12 feet from edge. Is about 225 feet east of Wolf run and 968 feet east of Monument No. 412. On property of Bradford Land Company.

Monument No. 412. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Three corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on southwest side of a road leading from Wolf run to Willow creek. On property of Bradford Land Company.

Monument No. 413. Mile-stone No. 180.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "180 M." Stands on very steep northwesterly slope, 66 feet east of a brook in a deep ravine, and which runs northerly into a clump of hemlocks from 8 to 10 inches in diameter and is just north of a blazed beech. On property of Bradford Land Company.

Monument No. 414. Mile-stone No. 181.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "181 M." Stands on southeasterly slope by the side of a large oak log, about 15 feet northeast of a cucumber and an ash tree, each 8 or 10 inches in diameter, and about 25 feet northeast of small pine tree, and in open woods, about 250 feet west of clearing which is cultivated. Stone is hard to find. On line between W. S. Weed & Co., and Bennis & Co.

Monument No. 415. Mile-stone No. 182.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y."; on east side "182 M." Stands in small opening in thin, brushy woods on steep southerly slope north of Willow creek valley, and about 60 feet east of a 14-inch pine, which is included in a triangle formed by three oak trees. Stone is about 300 feet south of summit of ridge and about 8 feet southeast of an 18-inch oak tree. On line between Jay White and Stone estate.

Monument No. 416. County Stone.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. In good condition. On southwest side are the letters "W. Co."; on southeast side "McK."; on northwest side "N. Y." Has diagonal grooves and marks corners of counties of Warren and McKean in Pennsylvania. Stands in thick, young woods, about 50 feet north of small clump of saplings; is on steep southwesterly slope 297 feet west of Monument No. 415 and just at the point of ridge to the southeast. On line between Jay White and Stone estate.

Monument No. 417. Mile-stone No. 183.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "183 M." Stands under line wire fence on north edge of clearing, and on gentle southerly slope between two branches of Willow creek, one of which is 800 feet east and the other 400 feet west. On line between John Warren and Perry Root.

Monument No. 418. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of a road leading northerly from Corydon and about 100 feet north of John T. O'Dell's house. On line between John T. O'Dell and Genung estate.

Monument No. 419. Allegany Indian Monument.

Is an iron monument standing in middle of road leading from Corydon to Wolf Run, and stands 7 inches above surface of the

ground. Is $6\frac{1}{2}$ inches south of line, 15 feet west of Monument No. 418, and about 20 feet east of a large chestnut tree on the opposite side of road. On line between John Warren and Perry Root. This stone was set by the U. S. Commission in 1878 to mark the southeast corner of the Indian reservation.

Monument No. 420. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands 15 feet east of east rail of track of the Pennsylvania railroad (River division). A large square post, painted white, stands on the west side of tracks, and in black letters on one side is written "Pennsylvania"; on the other "New York"; on the third side "Warren Co."; on fourth side "Cattaraugus Co."

Monument No. 421. Mile-stone No. 184.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "184 M." Stands in cleared, cultivated land just a little south of line stump fence, 22 paces east of west end of a stump fence where a wire fence begins, and runs east on line. Is 570.3 feet east of Monument No. 422. On property of Allegany Indian reservation and Daniel Root.

Monument No. 422. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of river road leading from Corydon to Indian reservation. On line between Allegany Indian reservation and R. H. Duntley.

Monument No. 423. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on right bank of Allegheny river close to a spring, and on west side of road leading from Corydon to Steamburg. On line between Allegany Indian reservation and J. K. Webb estate.

Monument No. 424. Mile-stone No. 185.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "185 M." The southeast side is broken so that the upper part of the figure "1" is gone. Stands in small cleared spot in thick briar patch, and on southeasterly slope. Is south of thick woods, about 200 feet west of a small brook in a shallow ravine, just north of very steep northerly slope, and under line barbed-wire fence. To find this stone, go to Highway Monument No. 427, then follow fence east to Monument No. 424. On line between Allegany Indian reservation and J. K. Webb estate.

Monument No. 425. Allegany Indian Monument.

Is an iron monument, and stands 18 inches above surface of the ground. Stands on gentle easterly slope in thick growth of briars, on south side of a large hemlock stump, and on north edge of sharp slope which ends in a swamp. Is 394.4 feet west of Monument No. 424, and under line of barbed-wire fence, which follows from Monument No. 424 to junction with wire fence running north to road. This stone was placed in 1878 to mark southwest corner of Allegany Indian reservation. On line between Indian reservation and J. K. Webb estate.

Monument No. 426. Reference Monument No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south face are the letters "Pa."; on north "N. Y." Stands on south side of, and close to Monument No. 425. On line between Indian reservation and J. K. Webb estate.

Monument No. 427. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands just north of small brook on west side of road leading southwesterly from State line run road. On line between Sylvester Birch and Munsen Bliss.

Monument No. 428. Mile-stone No. 186.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "186 M." Stands on west side of State line run road, 35 feet north of creek, and at a point where road turns southerly into Pennsylvania. Is in cleared fields under a fence which runs north and south, about 1,000 feet west of a schoolhouse and 13 paces northwest of bridge. On line between Sylvester Birch and Munsen Bliss.

Monument No. 429. Mile-stone No. 187.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "187 M." Stands on steep southerly slope in old slashing, grown up to brush, and thick with large briar bushes; is about 10 feet northwest of an 8-inch beech which is broken off 10 feet from ground, remains on stump and lies in horizontal position. Is 100 feet west of a live 8-inch hemlock and 850 feet east of Monument No. 430. On line between Hiram Scott and Thos. Inantanto.

Monument No. 430. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of a good road and north of small timber; a house and barn are about 600 feet northwest of stone. On line between Chas. Dalrymple and John Schobey.

Monument No. 431. Highway Stone No. 2. Section Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east half of north face "S. 34" and on west half "S. 49." Is about 40 feet south of a very bad log-road, and about 100 feet west of a log-road used now in hauling logs to a portable sawmill, located on the east. Stands in thick small timber, in wet ground (water running about stone) in

slight ravine, and is 1,014 feet east of Monument No. 432. Stands firm in ground, but is of no use as highway stone. Marks corners of sections 34 and 49 of Township 1, Range 9 of the Holland Land Company's Purchase. On line between Dalrymple and Thos. Inantanto.

Monument No. 432. Mile-stone No. 188. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. On south side are the letters "Pa." and "188 M."; on north face "N. Y." Stands in stone pile, in bushy weeds and small timber, on west side of abandoned log-road, about 50 feet directly north of a large, blazed beech tree standing on north side of road running north and south. From here one can drive through fields to a road which leads from South Valley to Ackley.

Monument No. 433. Township Corner Stone No. 1.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. Two corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." There are no diagonal grooves nor inscriptions on this stone as reported in report of 1901, but it marks corners of the townships of Elk and Pinegrove in Warren county, Pa. Stands on north side of line rail fence, about 15 feet east of a rail fence running southerly, about 20 feet north of a small oak tree and is 292.3 feet east of Monument No. 434. Stands on southerly slope. On line between S. L. Burt and Wm. Robins.

Monument No. 434. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands in open cleared level fields on east side of Quaker hill road leading from South Valley to Ackley. On line between Wm. Robins and S. L. Burt.

Monument No. 435. Mile-stone No. 189.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y." Stands at foot of steep westerly slope, on north edge of growth of underbrush and in open, cleared field about 3 feet northwest of a large, blackened stump. Is 730.3 feet west of Monument No. 434. On property of S. L. Burt.

Monument No. 436. County Stone.

Made of granite, 12 x 6 inches, 17 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east half of north face "Ca."; on west half "Ch." Marks corners of counties of Cattaraugus and Chautauqua, in New York. Stands in cleared land on southerly slope at east end of a stump fence where board fence begins, and is also at a junction with a rail fence. Is 1,380.1 feet west of Monument No. 435. On line between Wm. Robins and F. Burk. To find this stone, follow rail fence south to stump-and-board fence, from where the road turns sharp to the west.

Monument No. 437. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are letters "Pa."; on north side "N. Y." Stands on northeasterly slope at corner of board-and-wire fence, and on west side of road leading from the county line of Cattaraugus and Chautauqua counties to Ackley. On line between Davis and Bullock.

Monument No. 438. Mile-stone No. 190.

Made of granite, 6 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "190 M." Stands on nearly level ground in small narrow gully, under line wire fence, and at junction of wire fence running north. Is also south of a small brook running west. At northwest corner of brush lot. To find this stone, go north about 1,320 feet from W. F. Atkin's house through fields. On line between W. Wilson and W. F. Atkins.

Monument No. 439. Highway Stone No. 1. Section Stone.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y."; on east half of north face "S. 9"; on west half "S. 17." Marks corners of sections 9 and 17, Township 1, Range 10 of the Holland Land Company's Purchase. Stands about 15 feet east of a road leading from Frewsburg to Ackley station, and about 30 feet south of High Spring creamery. On line between Wm. Collton, C. Cole, G. G. Anderson and E. E. Herrick.

Monument No. 440. Mile-stone No. 191.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "191 M." Stands upon southeasterly slope in cleared land, under rail line fence, just north of small patch of brush, and 1,635 feet west of Monument No. 439. On line between Wm. Collton and G. G. Anderson, 100 feet west of stump fence running north.

Monument No. 441. Four-Mile Post of Holland Land Company's Purchase.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "4 M. P." Stands in cleared field upon very steep bluff under line rail fence, and just west of bars. Is about 100 feet west of brook, and 1,107.5 feet west of Monument No. 440. On property of Carl Lundburg.

Monument No. 442. Mile-stone No. 192.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "192 M." Stands in open chestnut grove south of thick woods, and on westerly slope under line wire fence. Is about 40 feet east of small ravine, and about 395 feet west of summit of ridge. To reach stone, follow a private road leading from a road which runs from Pine Grove to Fentonville, just where it turns sharply to the west before going into Fentonville; go to abandoned buildings, then south through fields to wire fence, thence east to stone. On line between A. H. Lake and Harrison Fenton.

Monument No. 443. Highway Stone No. 1.

Made of granite, 12 x 6 inches. Found this stone with the earth scraped away from the west side 24 inches. Reset its top 12 inches above surface of ground in good condition. Stands on side of ditch. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Pine Grove to Fentonville. On line between Richardson and Mrs. Noyce.

Monument No. 444. Mile-stone No. 193.

This stone was removed by the Warren and Jamestown Street Railway Co., and left on bank. This fact was reported to H. A. Van Alstyne, State Engineer and Surveyor of the State of New York, and to Major Isaac B. Brown, Secretary of Internal Affairs, State of Pennsylvania, who appointed, respectively, Mark W. Nelson, assistant engineer of the State of New York and O. P. Eaton, representing the State of Pennsylvania, to reset this monument, which they did in the following manner:

By placing an iron plate 6 inches in diameter, 1 inch thick, with a quarter-inch hole in center, 4 feet 6 inches deep. Mr. Nelson setting this plate by transit by line established by him. Then they set the stone in the same manner. It is made of granite, 6 x 6 inches, 3 inches above surface of ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "193 M." Stands on railroad embankment 19 feet west of westerly rail of electric road. On line between F. E. Bennett and Mrs. Martha Allen.

Monument No. 445. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, top level with road-bed. Two corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands about 3 feet west of track of the Dunkirk, Allegheny Valley and Pittsburgh railroad; a sign-board is about 25 feet west of track, and bears inscriptions "Pennsylvania" and "New York."

Monument No. 446. River Stone No. 1.

Made of granite, 6 x 6 inches, 2 inches below surface of the ground. In good condition. On south side are the letters "Pa.";

on north side "N. Y." Stands on cleared land under barbed-wire line fence about 6 feet north of an elm tree, 18 inches in diameter, and is about 40 feet east of left bank of Conewango river. During high water, earth is washed over stone. On property of Mr. Adams.

Monument No. 447. River Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west bank of Conewango river. To find this stone, go to Monument No. 448, then in back of Bruston's house, through fields to stone. On line between O. A. Bruston and Wm. Townsend.

Monument No. 448. Mile-stone No. 194.

Made of granite, 6 x 6 inches, 7 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "194 M." Stands on west side of road leading from Jamestown, N. Y., to Warren, Pa., about 3,575 feet west of the Conewango river, and about 126 feet south of residence of Griswold. On property of Wm. Townsend. A large sandstone monument, set by A. T. Presdergast in 1871, stands at west edge of Mile-stone No. 194; has two corners chipped. Is 4 feet 6 inches high, 19 inches wide and 6½ inches thick. Stands close to Monument No. 448; on south side is the word "Pennsylvania" and on north side "New York."

Monument No. 449. Mile-stone No. 195. Township Corner Stone.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. On southeast side are the letters "P. G."; on southwest side "F."; on northeast side "195 M." The south side is broken, taking the upper part of the letter "F" off. Has diagonal grooves and marks corners of townships of Pine Grove and Farmington, Warren county, Pa. Stands in cleared fields, 3 paces northwest of a cucumber stub and 367.6 feet east of Monument No. 450. On property of Daniel Griswold and Wm. Townsend.

Monument No. 450. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Kiantone to Russell. On line between Wm. Townsend and D. Griswold.

Monument No. 451. Mile-stone No. 195½.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "195½." Stands at east edge of eighth latitude stone, on north edge of a slashing, and near west brow of a narrow ravine; is 2 feet south of wire fence, about 10 feet southwest of the more westerly one of two apple trees, and is about 600 feet west of Monument No. 450. On line between Wm. Townsend and Brewster.

Monument No. 452. Mile-stone No. 196.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. Three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "196 M." Stands on gentle northerly slope on north side of thick woods, 15 paces west of big blazed beech tree on line. A wire fence runs north from this tree about 20 feet northwest of a large blazed maple tree. To reach this stone, go from main road into a private road of Albert Standish's; stone is about 800 feet southwest of residence of Standish. On property of Albert Standish.

Monument No. 453. Mile-stone No. 197.

Made of granite, 12 x 6 inches, 28 inches above surface of the ground, and leaning. Reset its top 12 inches above surface of the ground, in good condition. On south side are the letters "Pa." and "197 M."; on north side "N. Y." Stands in cleared land on gentle northerly slope, 10 paces from east side of road leading from Farmington to Jamestown. Serves as highway stone as well as mile-stone. On property of T. Gustofson.

Monument No. 454. Highway Stone No. 1. Town Stone.

Made of granite, 12 x 6 inches, 13 inches above surface of the ground. On south side are the letters "Pa."; on north side "N. Y."; on east half of north side "K."; on west half "B." Marks corners of towns of Kiantone and Busti, Chautauqua county, N. Y. Stands on east side of road leading from Warren to Jamestown, about 60 feet south of a small brook which crosses road just where road turns southwest. On property of L. Strong.

Monument No. 455. Mile-stone No. 198.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "198 M." Stands on level ground and in line brush-and-rail fence, which follows west 705.3 feet from Monument No. 454. Is on south edge of woods, and 1,000 feet northwest of J. S. Jones's house. On line between J. S. Jones and Mrs. E. Bucklin.

Monument No. 456. Holland Land Company's Purchase. Mile-Post No. 2½.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on west side "2½ M. P." Stands in clear, open woods, on westerly slope, about 300 feet west of summit of ridge; stands under a straight built rail fence and is 2,475 feet west of Monument No. 455. On line between J. S. Jones and Jasper Cole.

Monument No. 457. Mile-stone No. 199. Highway Stone.

Made of granite, 12 x 6 inches, 13 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." and "199 M." Stands at south edge of woods, and on west side of road leading from Jamestown to Warren. On line between H. A. Nelson and L. A. Coleman.

Monument No. 458. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters

REPORT OF STATE ENGINEER.

Monument No. 450. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Kiantone to Russell. On line between Wm. Townsend and D. Griswold.

Monument No. 451. Mile-stone No. 195½.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "195½." Stands at east edge of a clearing, on north edge of a slashing, and near west corner of a farm. Ravine is 2 feet south of wire fence, about 10 feet west of the more westerly one of two apple trees, and is on line between Wm. Townsend and Forest.

Monument No. 452. Mile-stone No. 196.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. Three corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "196 M." Stands on gentle westerly slope on north side of a thick woods, 15 paces west of a beech tree on line. A fence runs north from this stone, 20 feet northwest of a blazed maple tree. To the west of the stone, go from a private road of Allen to the west of residence of ... On property ...

Monument No. 453.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Kiantone to Russell. On line between Wm. Townsend and D. Griswold.

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Mile-stone No. 204.
 6 inches, 10 inches above surface of the
 shipped; otherwise in good condition. On
 letters "Pa."; on north side "N. Y."; on east
 Stands at corner of Pennsylvania Warrants Nos.
 on north edge of thick, open woods, at southwest
 ing, under line wire fence. Is 15 feet east of wire
 north. To find this stone, go in back of Peter
 e, following up creek to line, then west to stone.
 en Birklain and Catlin.

"Pa."; on north side "N. Y." Stands in open, cleared land on west side of road leading from Busti to Warren. On line between W. Sanford and W. L. Holcomb.

Monument No. 459. Mile-stone No. 200.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. Northeast and southwest corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "200 M." Stands under line rail fence at junction with rail fence running south. Is on south edge of woods, on southerly slope, and north of a ravine. On line between W. L. Holcomb and W. Stanford.

Monument No. 460. Town Stone.

Made of granite, 6 x 6 inches, top level with surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." The report of 1901 gives this stone as marking the corners of the townships of Sugar Grove and Farmington, in Warren county, Pa., but there are no marks to indicate it. Stands in line rail fence at junction with a rail fence running south. Is about 150 feet south of a creek, and about 2,500 feet west of Monument No. 459, and is difficult to find. On line between H. Page and W. Stanton.

Monument No. 461. Mile-stone No. 201. Highway Stone.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of road leading from Busti to Chandlers Valley. On line between Stanford and Simmons.

Monument No. 462. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Southwest corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on west side of stage road leading from Jamestown to Sugar Grove. On line between Wm. Weld estate and L. Ricker estate.

Monument No. 463. Mile-stone No. 202.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "202 M." Stands on north side of Weld's garden and 241.35 feet west of Monument No. 462. On line between Wm. Weld estate and L. Ricker estate.

Monument No. 464. Mile-stone No. 203.

Made of granite, 6 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "203 M." Stands in thick woods and low brush on nearly level ground, under line wire fence. Is about 500 feet east of a brook in deep ravine, about 2,083 feet east of Monument No. 465, and about 50 feet west of an old rail fence and brush fence running north. To find this stone, go south through cleared field to state line from Hayes Boswell's house, which stands near a road running north. On line between Hayes Boswell and S. Barnett.

Monument No. 465. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 7 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Jamestown to Sugar Grove. On line between S. Barnett and W. Spencer.

Monument No. 466. Mile-stone No. 204.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "204 M." Stands at corner of Pennsylvania Warrants Nos. 243 and 244, on north edge of thick, open woods, at southwest corner of clearing, under line wire fence. Is 15 feet east of wire fence running north. To find this stone, go in back of Peter Johnson's house, following up creek to line, then west to stone. On line between Birklain and Catlin.

Monument No. 467. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Ashville to Sugar Grove. On line between S. M. Seabury and J. Toolfire.

Monument No. 468. Mile-stone No. 205.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "205 M." Stands at corners of Pennsylvania Warrants Nos. 193 and 243, in thick woods and heavy brush at junction with board fence running easterly and about 2,404 feet east of Monument No. 469. On level ground, near board fence running southerly, and an old rail fence running south to main road. On line between Madison and Lopes.

Monument No. 469. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 15 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Ashville to Sugar Grove. On property of C. Lopes.

Monument No. 470. Mile-stone No. 206. Township Corner Stone.

Made of granite, 6 x 6 inches, 15 inches above surface of the ground. In good condition. On southwest side is the letter "F."; on southeast side "S. G."; on northwest side "N. Y."; on northeast side "206 M." Has diagonal grooves and marks corners of townships of Sugar Grove and Freehold, Warren county, Pa. Stands in cleared land on northeasterly slope about 200 feet west of the west end of rail line fence. On line between Wm. Gates and C. Lopes.

Monument No. 471. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at north edge of woods

on east side of road leading from Sugar Grove to Watts Flats. On line between Spooner and Bindley.

Monument No. 472. Mile-stone No. 207.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "207 M." Stands at corner of the Pennsylvania Warrants Nos. 192 and 187, and at northwest corner of a triangular piece of woods; is on nearly level ground under line rail fence at junction with wire fence running south, and is 490.3 feet west of Monument No. 471. On line between David Spooner and C. S. Woodburn.

Monument No. 473. Mile-stone No. 208.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "208 M." Stands on level ground in thick, open woods, 10 feet west of top of bluff, on west bank of hollow ravine and about 45 feet west of Deer Lick creek; is at corner of line barbed-wire fence going north from a point where a road runs south from main road which leads to Bearlake. On line between Cross and Allen.

Monument No. 474. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 2 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands near driveway leading to O. E. Cross's house, and on east side of road leading from Wrightsville to Mayville. On line between Effie A. Cross and De Witt Allen.

Monument No. 475. Mile-stone No. 209.

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "209 M." Stands in level, cleared land, 30 feet west of right bank of Little Broken Straw creek; is under line board fence and 3 paces west of board fence running south. On line between Grant Price and Ola Cross.

Monument No. 476. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Panama to Lottsville. On line between H. N. Cornish and Jos. Van Ness.

Monument No. 477. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 12 inches above surface of the ground. Corners and edges slightly chipped; otherwise in good condition. Leans a trifle to the west. On south side are the letters "Pa."; on north side "N. Y." Stands about 4 feet west of Erie railroad tracks on a high embankment, and about 10 feet east of a post which marks the state line and is painted white. On south side, reading from top down, in the inscription "Pennsylvania State Line," and on north side "New York State Line." Is 986.7 feet east of Monument No. 478.

Monument No. 478. Mile-stone No. 210.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "210 M." Stands in old slashing just east of woods, on low knoll about 20 feet north of a clump of low bushy hemlocks, and about 100 feet east of the foot of a very steep easterly slope. On line between Aaron Cornish and Wm. Robinson.

Monument No. 479. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands east of an apple orchard on west side of road leading from Lottsville to Panama. On line between Chapman and Mrs. Morgan.

Monument No. 480. Mile-stone No. 211.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. Corners slightly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on

east side "211 M." Stands in line rail fence at junction with rail fence running south, about 150 feet east of a ravine, about 30 feet northwest of a black cherry tree, and about 2,000 feet east of a large boulder which is at junction of board fence running north. On top of boulder is a cross which marks the line between sections 41 and 49 in Township 1, Range 13 of Holland Land Company's Purchase. To find stone, follow line fence from Monument No. 481 east to rail fence running south, which indicates the line between Pennsylvania Warrants Nos. 103 and 392. On line between Jas. Hartson and P. Cooper.

Monument No. 481. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Bearlake to Panama. On line between J. Bordwell and Jas. Hartson.

Monument No. 482. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of westerly road leading from Bearlake to Panama. On line between H. Howard and Jas. Hartson.

Monument No. 483. Mile-stone No. 212. Township Corner Stone.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. North, south and west corners chipped; otherwise in good condition. On southwest side is the letter "C."; on southeast side "F."; on northwest side "N. Y."; on northeast side "212 M." Has diagonal grooves and marks corners of townships of Freehold and Columbus, Warren county, Pa. Stands in level ground, at east end of wire line fence, and at corner of board fence which runs south; is on south edge of woods, and at northwest corner of a clearing. To reach stone, follow line fence 1,017 feet west from Monument No. 482. On line between H. Howard and Jas. Hartson.

Monument No. 484. Highway Stone No. 1.

Monument made of granite, 12 x 6 inches, 24 inches above surface of ground and leaning. Reset its top 12 inches above surface of the ground; in good condition. Northeast and southwest corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Kings Corners to Bearlake, opposite residence of Gordon. On property of Gordon.

Monument No. 485. Mile-stone No. 213.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "213 M." Stands in open, cultivated land on south side of boundary line road, and 738 feet west of Monument No. 484. On property of Gordon.

Monument No. 486. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 18 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on south side of boundary line road, at junction with abandoned road running south to Columbus. On line between Gordon and Bordinger.

Monument No. 487. Mile-stone No. 214.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa." and "214 M."; on north side "N. Y." Stands in level, cleared field, north of line rail fence in weeds, just west of swamp; is on north side of boundary line road and 458.8 feet east of Monument No. 488. On property of Bordinger.

Monument No. 488. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at west end of boundary line road on east side of road leading from Columbus to Panama. On property of Bordinger.

Monument No. 489. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Northeast and northwest corners chipped; otherwise in good condition. On south face are the letters "Pa."; on north face "N. Y." Stands at east end of barbed-wire fence on southwest side of road leading to Clymer station. On line between S. Barber and C. Cooley.

Monument No. 490. Mile-stone No. 215.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; and on east side "215 M." Stands in open timber, thick with low brush and briars, on knoll about 50 feet south of wood-road, about 30 feet east of deep ravine, and about 1,221 feet west of Monument No. 489. On line between S. Cooley and Ewers.

Monument No. 491. Section Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east half of north side "S. 17"; and on west half "S. 25." Marks corners of sections 17 and 25, in Township 1, Range 14 of Holland Land Company's Purchase. Stands in level land, on south edge of thick woods near northeast corner of a clearing; is at east end of line board fence at junction with fence running north, and 3 feet south of an elm tree. On line between S. Cooley and Ewers.

Monument No. 492. Mile-stone No. 216.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east side "216 M." Stands in open cleared field on westerly slope and 747.7 feet east of Monument No. 493. On line between Cooley and Walton.

Monument No. 493. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters

"Pa."; on north side "N. Y." Stands at east end of boundary line road leading from Columbus to Clymer station. On line between S. Cooley and C. Walton.

Monument No. 494. Mile-stone No. 217. Highway Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Northeast corner chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; under "Pa.," is "217 M." Stands on north side of boundary line road about 750 feet west of west side of summit of ridge, and east of Broken Straw creek. On line between Brown and Gillett.

Monument No. 495. County Stone.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on west half of south side "E. Co."; on east half "W. Co."; and on north side "N. Y." Marks corners of counties of Warren and Erie in Pennsylvania. Stands on north side of boundary line road, upon westerly slope, 48 feet west of a large maple stump, and 462.6 feet west of Monument No. 494. On line between Gillett and King.

Monument No. 496. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south face are the letters "Pa."; on north side "N. Y." Stands east of old woolen-mill on north of boundary line road, just where it turns sharply to the south. On property of Wm. Brown.

Monument No. 497. Railroad Stone.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands about 30 feet west of the Allegheny division of the Pennsylvania railroad track, and about 7 feet west of a sign-post painted white, and marking line between the two states, which has "Pennsylvania" on south side and "New York" on north side, each read from top of post down.

Monument No. 498. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on east side of road leading from Columbus to Clymer village. On property of Michael McFarlin.

Monument No. 499. Mile-stone No. 218.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; and on east side "218 M." Stands on south edge of open, maple grove and on north edge of apple orchard, about 40 feet east of two large maple trees nearly on line; is on northeasterly slope in line rail fence and 786.6 feet west of Monument No. 498. On property of Michael McFarlin.

Monument No. 500. Holland Land Company's Purchase. Section Stone.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On south side are the letters "Pa."; and on north side "N. Y." Marks corners of sections 49 and 57 in Township 1, Range 14 of Holland Land Company's Purchase, and has no diagonal grooves. Stands midway upon very steep northwesterly slope, on southeast side of deep ravine, in bushy woods, and just west of an orchard. On property of Wm. Leeters.

Monument No. 501. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands at east end of boundary line road, and on south side of road leading to Clymer village. On property of M. McFarlin.

Monument No. 502. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters

"Pa."; on north side "N. Y." Stands on north side of boundary line road at the junction of a road running southerly to Corry. In front of residence of G. W. Beebe, and on property of Bebee.

Monument No. 503. Town Stone. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y."; on east half of north side "C."; on west half "F. C." Marks corners of towns of French Creek and Clymer in Chautauqua county, N. Y. Stands on north side of boundary line road, close to traveled part of road. On property of D. Howell.

Monument No. 504. Mile-stone No. 219. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Corners and west edge chipped; otherwise in good condition. On south side are the letters "Pa." and "219 M."; on north side "N. Y." Stands on north side of boundary line road, upon level ground, and on second summit west of the Big Broken Straw valley; a large boulder stands on each side of, and close to monument. Is about 700 feet west of Monument No. 503. On property of D. Howell.

Monument No. 505. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road at junction with road running southerly to Corry. On line between H. A. Rickers and S. Dibble.

Monument No. 506. Holland Land Company's Purchase. Mile-Post 5½. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." and "5½ M. P." Stands on north side of boundary line road, about 1,000 feet west of Monument No. 505. On line between Wm. Rickerson and Stephen Flarity.

Monument No. 507. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. All corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road at junction with road running northerly to Clymer village. On property of Henry Habink and Mrs. Elizabeth While.

Monument No. 508. Mile-stone No. 220. Highway Stone No. 4.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa." and "220 M." Stands on north side of boundary line road, about 3 feet from track of road; is on east slope of second knoll, and west of deep ravine east of valley of Hare creek. On property of Henry Habink.

Monument No. 509. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa."; on north side "N. Y." **Stands** on west end of boundary line road on west side of road **leading** from Corry to Findley Lake. On line between Ira Edwards and Wm. Fenton.

Monument No. 510. Mile-stone No. 221. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On south side are the letters "Pa." and "221 M."; on north side "N. Y." Stands on north side of boundary line road just where it intersects line, and runs westerly; is on summit of very steep easterly slope. On line between Austin and Condon.

Monument No. 511. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 24 inches above surface of the ground, leaning badly. Reset its top 12 inches above surface of the ground, in good condition. Three corners chipped. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road and on west side of road running north and south. Is in front of District schoolhouse No. 3.

Monument No. 512. Mile-stone No. 222. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 26 inches above surface of the ground, and leaning badly. Reset its top 12 inches above surface of the ground, in good condition. Southwest corner chipped. On south side are the letters "Pa." and "222 M."; on north side "N. Y." Stands in cultivated land on westerly slope on north side of boundary line road and 760.6 feet west of Monument No. 511. On line between Lloyd and Howard.

Monument No. 512-A. Highway Stone No. 1.

Made of steel, 20 inches above surface of the ground. Has metal plates with "New York" and "Pennsylvania" inscribed, respectively, thereon. Stands on north side of boundary line road at junction with road running north to Findley Lake, and is 45 feet east of Monument No. 513. Was set in 1900.

Monument No. 513. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. Three corners and west edge chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road, 45 feet west of Monument No. 512-A, and at junction with road running north to Findley Lake. Is 30 feet west of bridge. On line between Gensling and Weizer.

Monument No. 514. Mile-stone No. 223. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On south side are the letters "Pa." and "223 M."; on north side "N. Y." Stands on north side of boundary line road, on easterly slope, and on south edge of thick woods; is between two branches of Herrick creek, a short distance east of summit of ridge, and 397.8 feet west of Monument No. 513. On line between Gensling and Weizer.

Monument No. 515. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches below surface of the ground. On south side are the letters "Pa."; on north side

"N. Y." A steel beam, 5 x 3 inches, was set in 1904, its top 12 inches above surface of ground. Metal plates removed. Stands 20 feet due north from Monument No. 515 as an index to same. On line between L. D. Clark estate and Reynolds.

Monument No. 516. Mile-stone No. 224. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 10 inches above surface of ground. Northeast and northwest corners chipped; otherwise in good condition. On south side are the letters "Pa." and "224 M."; on north side "N. Y." Stands on north side of boundary line road, on second summit east of valley of French creek, and about 100 feet southwest of a schoolhouse. On line between L. D. Clark estate and Mrs. F. Moore.

Monument No. 517. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. Southeast corner very badly, and other corners slightly chipped. Otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y." Stands on north side of boundary line road at junction with road running southerly to Carter Hill, and is in front of B. C. Ottoway's house. On line between D. Morts and Ottoway estate.

Monument No. 518. Township Corner Stone. Highway Stone.

Made of granite, 12 x 6 inches, 4 inches above surface of the ground. Corners chipped; otherwise in good condition. On south side are the letters "Pa."; on north side "N. Y."; on east half of north side "S. 33."; on west half "S. 41." Marks corners of townships of Wayne and Amity, Erie county, Pa. Stands on north side of boundary line road on steep westerly slope, 376.3 feet east of the monument at the southwest corner of New York state. On line between Geo. Simmons and Mrs. Effie Bisbee.

Monument No. 519. Corner Stone.

Small monument, with diagonal grooves, in wagon track of boundary line road. This stone is buried out of sight. Stands

on level ground at foot of long westerly slope, east of valley of French creek, about 4,496 feet west of Mile-stone No. 224, and 825 feet east of the probable position of the original Mile-stone No. 225. It is 20 feet south of Monument No. 1, standing on north side of boundary line road, and 98.5 feet south of south side of the base of the large initial monument standing in the meridian boundary. It is set at intersection of the parallel and meridian boundary, and marks southwest corner of New York state. Has all corners chipped. On line between Bennett and Simmons.

End of parallel boundary.

(Monument No. 519 is written from the examiners' report of 1901. Being buried below the ground, we did not unearth it, and, therefore, do not make a report of it.)

Meridian Boundary.

The monuments on this boundary are similar in all respects to those on the parallel boundary. They are marked on the east side "N. Y."; on the west side "Pa." None of the fourth and fifth classes were set. Mile-stones which are not highway monuments (with one exception) are marked with appropriate numbers on the north face.

Monument No. 1. Highway Monument.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Southwest and southeast corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on level ground in cleared country, and on north side of road which follows the parallel boundary. On line between Geo. Simmons and J. H. Bennett.

Monument No. 2. Large Reference Monument.

Is a large block of Rhode Island granite, similar in all respects to the large initial monument on the right bank of the Delaware river, except that its east and west faces are marked. Is 100 feet north of southwest corner of New York, and stands on level ground, in cleared field, on east side of line fence and in the meridian of the corner monument, which is 98.5 feet south of the south side of its base. It is 6 feet high, including base, which

is 28 x 16 inches; the shaft is 18 x 12 inches. Has inscribed on west side "Pennsylvania Boundary, 1884, James Worrall, Christopher M. Gere, Robert N. Torrey, Commissioners. 100 ft. north of the S. W. corner of New York. C. M. Gere, Surveyor." On east side is inscribed "New York Boundary Monument, 1884, Henry R. Pierson, Elias W. Leavenworth, Chauncey M. Depew, Commissioners. 100 ft. north of the S. W. corner of New York. H. W. Clark, Surveyor." On line between Geo. Simmons and J. H. Bennett.

Monument No. 3. Mile-stone No. 18.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "18 M." Stands on west edge of thick woods, in clearing, on level ground, 7 feet west of line board fence, 38 paces north of fence running east and west, and 3,520 feet north of monument at southwest corner. On line between Sweet estate and Chas. Black.

Monument No. 4. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on north side of road leading from Wattsburg to Jamestown, on flats south of French creek. On line between F. M. Foote and Sweet estate.

Monument No. 5. Mile-stone No. 17.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "17 M." Stands in old slashing on south edge of thick woods, about 100 feet south of summit of ridge, and about 50 feet north of top of steep bluff on east edge of a clearing. Is under line wire fence. Is on north side of the valley of east branch of French creek, about 1,300 feet north of creek, and 2 feet southeast of a beech stump, 18 inches in diameter. On line between F. M. Foote and McGill.

Monument No. 6. Holland Land Company's Purchase. Mile-post No. 2.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "2 M. P." Stands in open space, on southwest side of short narrow ravine crossing line towards southeast; stands in the middle of northeast slope, in thick woods, 6 paces southeast of a large maple stump, and 1,794 feet north of Monument No. 5. On line between F. M. Foote and Albert Hayhow.

Monument No. 7. Mile-stone No. 16.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "16 M." Stands on southeasterly slope, in open woods, about 10 feet east of the foot of a ravine, 2 feet east of line barbed-wire fence, about 12 feet northwest of overturned stump, fallen east, and is 1,574 feet south of Monument No. 8. On line between Irving Maynard and Jas. Gilmore.

Monument No. 8. Highway Stone No. 1.

Made of granite, 12 x 6 inches. Stands on south bank of a ditch, and is exposed about 30 inches on north side, and 14 inches on south side. All corners chipped. On west side are the letters "Pa."; on east side "N. Y." Stands on south side of road leading from Wattsburg to Clymer. This stone should be reset. Is on line between J. Gilmore and Hubbard Connett.

Monument No. 9. Holland Land Company's Purchase. Mile-post No. 3.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Corners and edges chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y."; on south side "3 M. P." Stands in a meadow at southwest corner of woods, 245.5 feet north of Monument No. 8. On line between Chas. Huntley and Jas. Gilmore.

*Monument No. 10. Holland Land Company's Purchase.
Mile-post No. 3½.*

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y."; on south side "3½ M. P." Stands in thick, open woods, upon level ground, just at brow of short westerly slope, and 744.5 feet south of Monument No. 11. Is in open space, about 20 feet south of large hemlock stump, about 20 feet north of a tall beech, and about 25 feet east of old brush fence. On line between J. Gilmore and C. Huntley.

Monument No. 11. Mile-stone No. 15.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On west side are the letters "Pa."; east side "N. Y."; on north side "15 M." Stands on level ground, in bottom of deep ravine, in thick, open woods, about 6 feet north from foot of very steep bluff, about 35 feet west of dead hemlock about 4 feet in diameter, and stands on south bank, and about 20 feet east of an old line stump fence. On line between J. Gilmore and C. Huntley.

*Monument No. 12. Holland Land Company's Purchase.
Mile-post No. 4½.*

Made of granite, 6 x 6 inches, 8 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on south side "4½ M. P." Stands in line barbed-wire fence on level ground, in thick briars, bushes and small brush, about 10 feet from a black hemlock stump, and 742.8 feet south of Monument No. 13. A wood-road leads through stump-lot, which is situated on east side of road paralleling boundary line on west side, and about 1,500 feet north of church on the hill. To reach this stone, follow this old log-road east to line wire fence, thence along wire fence south to stone. On line between Whitney and H. Hinkson.

Monument No. 13. Mile-stone No. 14.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. Southwest corner chipped; otherwise in good condition.

On west side are the letters "Pa."; on east side "N. Y."; on north side "14 M." Stands under line barbed-wire fence, upon level ground, 30 feet north and 30 feet east of a brook which flows northwesterly, and on ground about 5 feet higher than brook. To find stone, follow wire fence from Monument No. 12 south. Stands in thick briar bushes and low underbrush. Hard to find. On line between Whitney and H. Hinkson.

Monument No. 14. Mile-stone No. 13.

Made of granite, 6 x 6 inches. Top flush with ground and in good condition. On west side are the letters "Pa."; on east side "N. Y."; on south side "13 M." Stands 1,940 feet south of Monument No. 15, upon brink of southeasterly bank of narrow ravine, about 50 feet southeast from the bottom of ravine, and on west side of barbed-wire fence. To find this stone, go through field south from Monument No. 15.

Monument No. 15. Highway Stone. Township Corner Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on north half of west side "G."; on south half "V." Marks corners of townships of Venango and Greenfield, Erie county, Pa. Stands on north side of road leading into Pennsylvania, called Town Line road. Also marks towns of Mina and French Creek, Chautauqua county, N. Y.

Monument No. 16. Highway Stone No. 2.

Made of granite, 12 x 6 inches, top flush with ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on north side of road running east and west, and about 30 feet east of brook in shallow ravine.

Monument No. 17. Mile-stone No. 12.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "12 M." Stands in cultivated field on a narrow knoll, north of shallow ravine, 208.5 feet north of Monument No. 16, and just on top of first knoll from road.

Monument No. 18. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on east side of short piece of boundary line road just where it turns southwest into Pennsylvania. On line between Franklin Haskins and Nehemiah Lathrop.

Monument No. 19. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on west side of boundary line road just where it turns easterly into New York. On line between Franklin Haskins and N. Lathrop.

Monument No. 20. Mile-stone No. 11.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. Northeast corner chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "11 M." Stands in level meadow, 781 feet north of Monument No. 19, about 200 feet east of Elvira Lewis' barn, and 15 feet west of rail fence. On line between Lewis and Lathrop.

Monument No. 21. Highway Stone No. 1.

Made of granite, 6 x 6 inches, 15 inches above surface of the ground. Corners slightly chipped; otherwise in good condition. On west side are the letters "Pa."; on north side "N. Y." Stands on north side of road leading easterly to Findley Lake. On property of Jos. Rockwell.

Monument No. 22. Mile-stone No. 10.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "10 M." Stands upon a terrace on steep northeasterly slope of a deep ravine, 437.8 feet south of a large hemlock which stands on north side of ravine, about 447 feet from stream. Has "NX111" cut on it, and is supposed to indicate the southeast corner of Warrant No. 13 in the township of Greenfield, Pa. Is 2,000 feet north of Monument No. 21, about 80 feet east of barbed-wire fence, and about 40 feet

south of where the creek crosses the line. On line of property of Jos. Rockwell.

Monument No. 23. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 14 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on south end of boundary line road where a road runs east and west. On line between A. Haskins and J. McIntosh.

Monument No. 24. Mile-stone No. 9. Highway Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on level ground in line of rail fence, on east side of boundary line road, in open country, and about 150 feet south of Black Water brook, which is a branch of French creek. On line between Douglass and Greenman.

Monument No. 25. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 16 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on west side of boundary line road at its junction with road running southeasterly to Findley Lake. On line between Douglass and Greenman.

Monument No. 26. Mile-stone No. 8. Highway Stone.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. Northeast and northwest corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." and "8 M." Stands on west side of boundary line road 950.7 feet north of Monument No. 25, in cultivated ground, 645.3 feet south of northeast corner of the township of Greenfield, Erie county, Pa. On line between Greenman and Douglass.

Monument No. 27. Township Corner Stone. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 2 inches below surface of the ground. Three corners chipped; otherwise in good condition. On

west side are the letters "Pa."; under "Pa." on north half of west side "N. E."; on south half "G." Stands on west side of boundary line road about 15 feet south of where brook crosses the line, and 3 feet northeast of a small boulder. During rain-storms water runs over stone. It is 62 paces northwest of northwest corner of small brick house, which is on east side of road. Marks corners of townships of Greenfield and North East, Erie county, Pa. On line between Douglass and Greenman.

Monument No. 28. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on west side of boundary line road nearly opposite Mina schoolhouse, District No. 13, and at a junction with road leading west to Grahamville. On line between F. H. Chasely and Greenman.

Monument No. 29. Highway Stone No. 3.

Made of granite, 12 x 6 inches, 3 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands in cultivated land on west side of boundary line road, and at junction with road running northeasterly to Mayville. On property of F. H. Chasely.

Monument No. 30. Mile-stone No. 7. Highway Stone.

Made of granite, 12 x 6 inches, 18 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on west side of boundary line road on cultivated land, opposite center of private road leading east to residence of Jay Stetson, and is 1,858 feet north of Monument No. 29. On property of Stetson estate.

Monument No. 31. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands in cleared country on west side of boundary line road, at junction with a road leading westerly to the borough of North-

east, and about 600 feet south of Monument No. 32. On line between J. Corbett and J. C. Pitt.

Monument No. 32. Mile-stone No. 6. Highway Stone.

Made of granite, 12 x 6 inches, 12 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." and "6 M." Stands on level cleared ground, on west side of boundary line road, 431.7 feet south of Monument No. 33, and just north of small stream. On line between Chance Gordon and C. Sigby.

Monument No. 33. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 20 inches above surface of the ground. Corners and edges badly chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands at north end of boundary line road, at its junction with road leading westerly to the borough of Northeast. Should be reset. On line between Chance Gordon and C. Sigby.

Monument No. 34. Mile-stone No. 5.

Made of granite, 6 x 6 inches, 14 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "5 M." Stands in cultivated land about 1,200 feet south of Monument No. 35, about 150 feet north of rail fence running east and west, and about 40 feet south of a hickory tree 6 inches in diameter. Stands in a wet place. On line between E. Stone and J. Barden.

Monument No. 35. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 17 inches above surface of the ground. Corners slightly chipped. On west side are the letters "Pa."; on east side "N. Y." Stands on north side of road leading from Northeast to Sherman. On line between Tripp estate and E. Stone.

Monument No. 36. Mile-stone No. 4.

Made of granite, 6 x 6 inches, 5 inches above surface of the ground. In good condition. On west side are the letters "Pa.";

on east side "N. Y."; and on north side "4 M." Stands in cleared land, on gentle northwesterly slope, on east side of line rail fence, and in narrow opening between two pieces of woods in New York state. On line between E. C. Kerr and the Tripp estate.

Monument No. 37. Gulf Stone.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On west side are the letters "Pa."; and on east side "N. Y." Stands in thick, open woods, on left bank of steep gorge, about 25 feet south of edge of bluff, 8 feet southwest of the most southerly one of a group of hemlocks standing on edge of bluff, and is 1,938 feet north of Monument No. 36.

Monument No. 38. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 8 inches above surface of the ground. Corners chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on north side of road leading from Ripley to Northeast. On line between J. Simonds and Edward Taylor.

Monument No. 39. Mile-stone No. 3.

Made of granite, 6 x 6 inches, 6 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "3 M." Stands in open cultivated land, on low, level ground, and in bottom of broad, shallow ravine. Stands in a pile of stones, 5 feet north of large boulder, about 100 feet south of fence running east and west, and 2,300 feet north of Monument No. 38. On property of J. Simonds.

Monument No. 40. Gulf Stone No. 1.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on level ground, in thick, young woods, about 40 feet south of south bank of canyon of Twenty-Mile creek, and about 3 feet east of rail line fence. On property of J. Simonds.

Monument No. 41. Gulf Stone No. 2.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on east edge of a clearing, just west of thick woods; is on level ground in a shallow depression, 40 feet west of low bluff, and 30 feet north of north bank of canyon of Twenty-Mile creek.

Monument Highway Section Stone.

Made of granite, 6 inches, above surface of the ground. In good condition. On west side the letters "Pa."; on east side "N. Y." Stands in a field, at southwest corner of woods, of a road, this point, is little.

*Monument No. 43.**Stone*

Made of granite, 6 inches, above surface of the ground. In good condition. On west side the letters "Pa."; on east side "N. Y." Stands in a field, at southwest corner of woods, of a road, this point, is little.

Monument

Made of granite, 6 inches, above surface of the ground. In good condition. On west side the letters "Pa."; on east side "N. Y." Stands in a field, at southwest corner of woods, of a road, this point, is little.

Monument

Made of granite, 6 inches, above surface of the ground. In good condition. On west side the letters "Pa."; on east side "N. Y." Stands in a field, at southwest corner of woods, of a road, this point, is little.

NEW YORK-PENNSYLVANIA
two south tracks. A sign-board is
bearing the words, "Pennsylvania" and
Did not unearth stone, and, therefore,

Monument No. 46. Highway Stone
Made of granite, 12 x 6 inches, 15
ground. In good condition. On west
on east side "N. Y." Stands at south
and on south side of mail road leading
about 50 feet east of a church and at
road now running from Erie to West

Monument No. 47. Highway Stone
Made of granite, 12 x 6 inches, 15
ground. Southwest corner chipped
On west side are the letters "Pa." ;
on west edge of a deep ditch and on
end of boundary line road. On line
Wolf.

Monument No. 48. Mile-stone
Made of granite, 6 x 6 inches, 10
ground. In good condition. On west
on east side "N. Y." ; on north
marshy ground, just on east side
north of Monument No. 47. On line

Monument No. 49. Highway Stone
Made of granite, 12 x 6 inches, 15
ground. In good condition. On west
east side "N. Y." Stands on
shore of Lake Erie. On line
bet

Monument No. 50. Initial Monument
Large monument of Quincy
with its broad faces set in
out of the ground, with
the east face as follows
Rio, State of New
boundary of Penns

Monument No. 41. Gulf Stone No. 2.

Made of granite, 6 x 6 inches, 3 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on east edge of a clearing, just west of thick woods; is on level ground in a shallow depression, 40 feet west of low bluff, and 30 feet north of north bank of canyon of Twenty-Mile creek.

Monument No. 42. Highway Stone No. 1. Section Stone.

Made of granite, 12 x 6 inches, 10 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands in a cleared field, at southwest corner of woods, and at end of a road, which at this point, is little used. Marks corners of sections Nos. 88 and 89.

Monument No. 43. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, 2 inches above surface of the ground. Corners badly chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands between the tracks of the New York, Chicago and St. Louis railroad (Nickel Plate); on south side of tracks is a state sign-board with the words "Pennsylvania" and "New York" written on it in large letters.

Monument No. 44. Mile-stone No. 2.

Made of granite, 6 x 6 inches, 9 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "2 M." Stands in a vineyard on level ground, about 150 feet west of a rail fence running nearly north and south, and 443.8 feet south of Monument No. 45 (which is on the embankment of the Lake Shore and Michigan Southern railroad), between two rows of grape vines.

Monument No. 45. Railroad Stone No. 1.

Made of granite, 6 x 6 inches, top 2 inches below surface of grade. Corners and edges badly chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on embankment of the L. S. & M. S. railroad, between the

two south tracks. A sign-board is on north side of embankment, bearing the words, "Pennsylvania" and "New York State Line." Did not unearth stone, and, therefore, did not see it.

Monument No. 46. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands at south end of boundary line road and on south side of mail road leading from Erie to Buffalo. Is about 50 feet east of a church and about 20 feet south of a trolley road now running from Erie to Westfield.

Monument No. 47. Highway Stone No. 2.

Made of granite, 12 x 6 inches, 9 inches above surface of the ground. Southwest corner chipped; otherwise in good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on west edge of a deep ditch and on east side of and at the north end of boundary line road. On line between Perry Wolf and Wm. Wolf.

Monument No. 48. Mile-stone No. 1.

Made of granite, 6 x 6 inches, 10 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y."; on north side "1 M." Stands in cleared, marshy ground, just on east side of line rail fence, and 849.8 feet north of Monument No. 47. On property of Garrett Felton.

Monument No. 49. Highway Stone No. 1.

Made of granite, 12 x 6 inches, 15 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands on north side of road running along the shore of Lake Erie. On line between Garrett Felton and J. Conley.

Monument No. 50. Initial Monument.

Is a large monument of Quincy granite, cut in the form of flat obelisk, with its broad faces set in the direction of the line. It stands 4 feet out of the ground, with a cross-section 2.0 x $\frac{3}{4}$ feet. It is lettered on the east face as follows: "Meridian of the west end of Lake Ontario, State of New York; 18 miles, 52.5 chains from the north boundary of Pennsylvania. Aug. 23rd, 1790."

The west face is marked as follows: "Territory annexed to the State of Pennsylvania, north latitude 42 degrees, 16 minutes and 13 seconds, variation 25 seconds west." The north side is marked as follows: "1869. Latitude of this stone 42 deg. 15 min. and 57.9 seconds. Longitude of this stone 79 deg. 45 min. 54.4 seconds. Variation 2 deg. 35 min. west." The south side is marked as follows: "1869. Erected by the States of New York and Pennsylvania, 440 feet south of Mon. now dilapidated, on which were the inscriptions on the east and west faces of this Mon." This monument was set in 1869, 440 feet south of the original monument of 1790. It was readjusted in alignment in 1885. Stands in cultivated land, on level ground, 150 feet north of Monument No. 49, and is at this date, in good condition. Is on line between the properties of Garrett Felton and J. Connor.

Monument No. 51. Bluff Stone.

Made of granite, 6 x 6 inches, 4 inches above surface of the ground. In good condition. On west side are the letters "Pa."; on east side "N. Y." Stands upon bluff overlooking Lake Erie, 40 feet south of the site of the original Initial Monument of 1790; is about 40 feet south of the bluff on the east side of a small ravine, and is 550 feet north of Monument No. 49. Is on line between Garrett Felton and J. Connor.

In concluding our report, we call your attention to the recommendations made by the examiners for the year 1903, which mentions the cutting of vista or swath and blazing the trees along that portion of the line called the wilderness. We most heartily indorse the recommendations made by the examiners for the year of 1903. We also call your attention to other localities which we will mention by giving the numbers of the monuments, that are very difficult to find on account of the brush, brier-bushes, and old dead tree tops, and no marks of any kind indicating the line. The numbers of such monuments are Nos. 17, 26, 34, 35, 58, 66, 77, 80, 164, 166, 170, 222, 275, 314, 330, 371, 381, 490.

As per your joint instruction, we herewith submit our report and beg to remain,

Very respectfully,

Signed by Commissioners of the State of New York and the
Commonwealth of Pennsylvania.

**Resetting Monument No. 444, New York-Pennsylvania
Boundary Line.**

CORRESPONDENCE.

PENNSYLVANIA — DEPARTMENT OF INTERNAL AFFAIRS.

HARRISBURGH, *November 26, 1906.*

HON. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor,*
Albany, N. Y.:

My Dear Sir.—I beg to acknowledge the receipt of your letter of November 23rd, and to say that I will co-operate with you in having the mile-stone No. 193, either replaced or have a new one placed in the original position, or if too badly broken, have a new mile-stone prepared and set in the proper location. I would suggest that you appoint your engineer who will represent your state, and he can communicate with Mr. O. P. Eaton at Corry, and they together can enter immediately upon the discharge of the duties indicated in this correspondence. My own impressions are that the railroad company which removed the monument from its proper location ought to stand the expense of a re-location and I think our representatives ought to so advise the company, but if this can not be arranged then the expense incident to the resetting of this monument, its erection or the placing of a new monument shall be borne by the two states in interest. I would be glad if you would see that an appointment is made of an engineer and instructions given at the earliest moment possible.

Yours very truly,

ISAAC B. BROWN,

Secretary.

REPORT.

CORRY, PA., December 29, 1906.

Hon. HENRY A. VAN ALSTYNE, *State Engineer and Surveyor of the State of New York, Albany, N. Y.*

Major ISAAC B. BROWN, *Secretary of Internal Affairs of the Commonwealth of Pennsylvania, Harrisburg, Pa.*

Gentlemen.— We respectfully submit the following as our report on the resetting of Monument No. 444, Mile-stone No. 193:

This monument was removed by the Warren and Jamestown Street Railway Co., and left on the bank. The undersigned, Mark W. Nelson, an engineer, representing the State of New York, and O. P. Eaton, representing the Commonwealth of Pennsylvania, reset this monument as follows:

We reset the monument by first placing an iron plate six inches in diameter and one inch thick, with a quarter-inch hole in its center, four feet and six inches deep, Mr. Nelson setting this plate by transit from the line established, as shown in his diagram herewith attached. Then we set the stone in the same manner. The stone stands on the railroad embankment, 19 feet west of the westerly rail of the railroad, its top being three inches above the surface of the ground, and the stone being in good condition. The monument is on the line between the properties of F. E. Bennett and Mrs. Martha Allen. Our work being completed, as per your joint instructions, we herewith submit our report, and beg to remain,

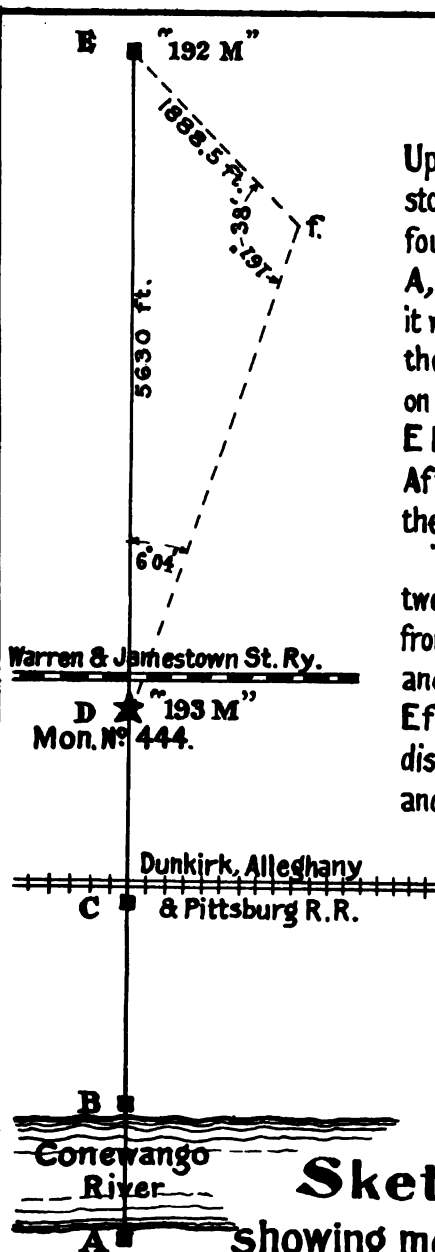
Very respectfully,

MARK W. NELSON,

Engineer, representing the State of New York.

O. P. EATON,

Commissioner of the Commonwealth of Pennsylvania.



EXPLANATION.

Upon testing the alignment of stones A, B and C, they were found to be in line.

A, B and C being on a tangent, it was assumed that E was on the same tangent, as shown on the original maps, monument E being in good condition.

After prolonging the line to D, the monument was reset.

There being obstructions between E and D, a line was run from E to f and the angles EfD and EDf and the distance Ef were measured. Then the distance ED was computed and found to be 5,630 feet.

Sketch

showing method of
resetting Monument No. 444.
New York-Pennsylvania Boundary Line.

INSTRUCTIONS TO ENGINEERS

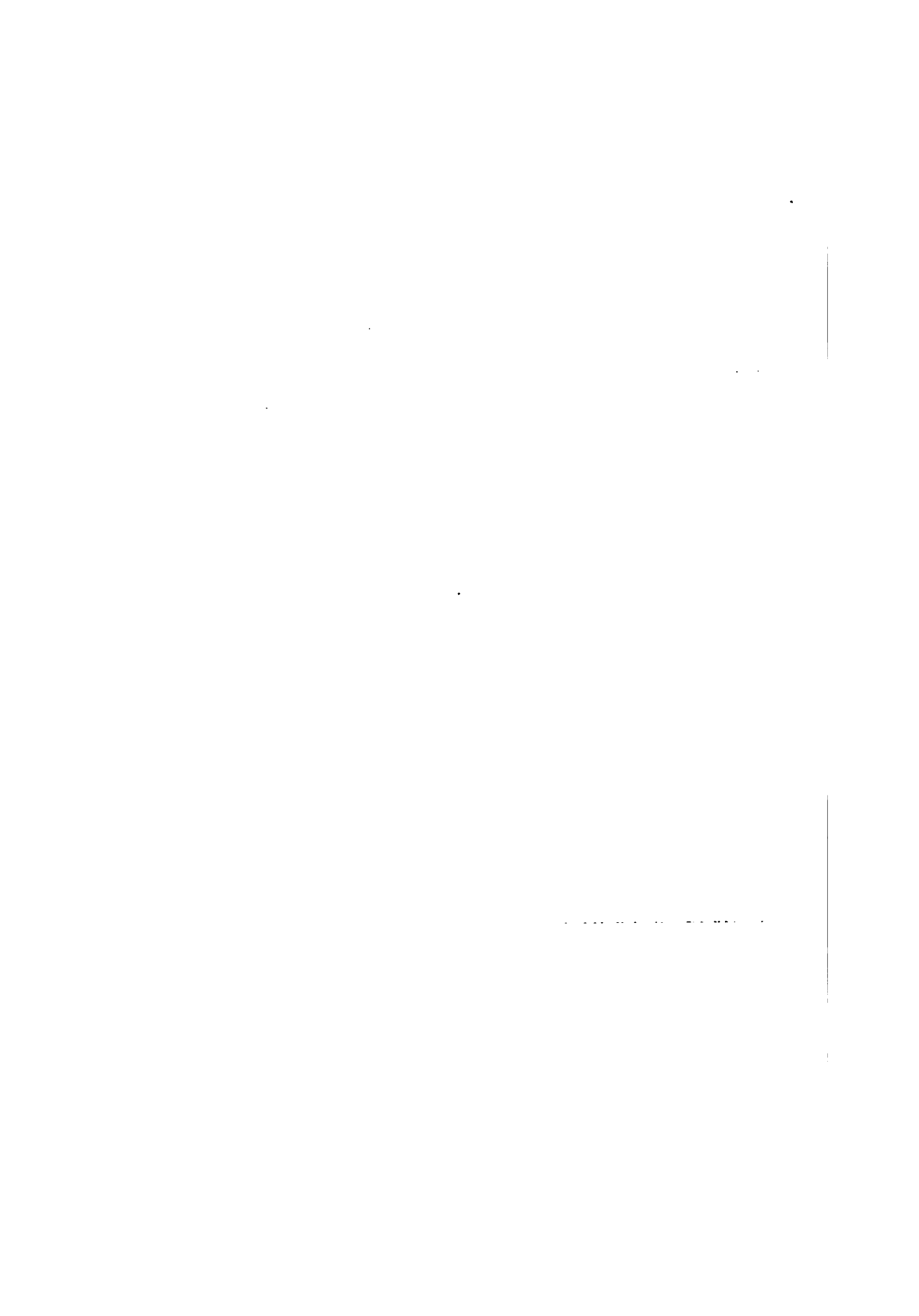
**TO GUIDE THEM IN MAKING SURVEYS, PREPARING PLANS, SPECIFICATIONS AND
ESTIMATES, AND IN SUPERINTENDING CONSTRUCTION OF**

HIGHWAY IMPROVEMENTS IN NEW YORK STATE

UNDER

Chapter 115, Laws of 1898

AND ACTS AMENDATORY THERETO.



Instructions to Engineers for Making Highway Improvements.

GENERAL INSTRUCTIONS.

Engineers will be assigned by the Division Engineer to the work to be performed, and will be subject to his instructions and to those of the Resident Engineer in charge. Wherever the term "Division Engineer" is used in the following instructions, it will be understood to mean the Division Engineer, personally, in all matters pertaining to the filing of reports and the incurring of expense; in all other matters it will be understood to mean the Division Engineer, personally, or such other engineer as he may designate.

Engineers will be held responsible for the accuracy of all work performed under their direction, and for the conduct of all their assistants.

An assistant engineer shall furnish a transit.

A leveler shall furnish a level.

A rodman shall furnish a rod.

Engineers and their parties on surveys, inspection or special duty will have their actual transportation expenses and subsistence paid. Engineers in charge of construction work and their parties will pay their own subsistence.

Engineers in charge shall engage such transportation as may be necessary in the progress of the work and pay for the same, submitting expense accounts on standard forms with proper vouchers for all expenditures greater than one dollar, except railroad or steamboat fares.

Engineers shall keep the Division Engineer informed of their post-office and telegraph or telephone address.

Engineers in charge of each office, contract or survey party shall submit a detailed report, on the standard blanks, at the end of each week to the Division Engineer, and shall keep, on standard forms, such other records as may be required.

SURVEYS.

Field notes shall be kept, in books furnished by the Division Engineer, according to the standard system, shown hereafter, and must be complete in themselves. On the completion of the work in any place, the note books must be returned immediately to the Division Engineer's office. Separate books shall be used for the surveys on each road and, except on very short roads, transit and level notes shall be kept in separate books.

The inside of each book must have plainly marked on it:

1. The name of the county in which the road is located.
2. The local name of the road and its petition number.
3. "Transit" or "level" notes, as the case may be, and the stations included within the book.
4. The names and duties of the members of the party making the survey.

An index shall be placed at the beginning of each book and also an explanatory table of all abbreviations used.

Bench marks, azimuths, culverts, and the character of the soil shall be recorded in tabular form in addition to the regular notes.

Where a survey joins a previous road survey, the base line and bench marks shall be tied to those of the old survey.

At the beginning of each day's notes, the date, the names of the members of the survey party, the duties performed by each, and the condition of the weather, must be recorded.

The dates of those working days on which no notes are taken and the reason therefor shall also be recorded in proper chronological order.

A small camera will be furnished each survey party and photographs shall be taken of any bridge, culvert, retaining wall or other object or place, the treatment of which, in preparing plans, will, in the judgment of the engineer in charge, be a matter requiring extra precaution or study. It is not desired that photographs be taken of any objects or places, the proper treatment of which presents no unusual features.

All films must be carefully listed, and the prints, when made, must be pasted in the note book near the proper station. Developing and printing may be done at the office of the Division Engineer.

During inclement weather the party shall compute and check as much as possible of the level notes.

LOCATION NOTES.

Surveys are to be based on transit lines, following in general the line of the existing highway. The azimuth of each line shall be taken and each transit point shall be referenced to as permanent objects as possible, by at least three measurements.

The offsets to the existing fences and all other measurements of the survey within the right of way shall be made with sufficient accuracy to show the true location of the objects within the nearest foot.

Walls, fences or other objects which indicate the boundaries of the road or of abutting property shall be located and the name of the owner of abutting property shall be noted. Where it is evident that it will be necessary to widen the road, a note shall be made stating on which side the land should be taken and the reasons therefor.

All buildings or other permanent objects within 100 feet of the transit line, or beyond 100 feet if they are of a nature to be affected by the details of the proposed improvement, shall be located. No more time should be spent in locating objects beyond the fence lines or beyond the probable location of the improved road than is necessary to ascertain their approximate size and location, and all dimensions of such objects may be estimated. This estimate must be made in the field in all cases and recorded at once in the notes.

The magnetic bearing of each property line and intersecting highway boundary line and the station at which they intersect the base line must be recorded. Where property lines or intersecting roads are indefinite, their apparent location shall be recorded and not left for the draftsman to locate from the sketch.

The location of all drives shall be recorded and a tabulated list made showing their character — whether house, barn or field entrance.

Existing paved ditches, curbing, catch-basins, railroad tracks, lines of telegraph and telephone poles and shade trees shall be located and the name of the company owning the tracks or poles shall be noted.

All bridges shall be located and sketch elevations, showing the design of the abutments and superstructure, size of openings, etc.,

shall be drawn in the back portion of the book. Complete notes regarding the condition of both bridge and abutments must be made.

All culverts shall be located and a tabular list, giving in each instance the station, size of opening, material of construction, length, condition and a recommendation regarding the proper size of new culvert, if one be necessary, shall be made in the back portion of the book. In describing the condition of culverts but two classifications shall be used — "Good" and "Bad." When a culvert is described as "Good," the understanding will be that it is likely to meet all requirements for at least five years after the proposed improved road is finished. When a culvert is designated as "Bad," the understanding will be that it is likely to utterly fail within five years from the date of the completion of the road.

If a culvert is designated as "Good," and any additions or alterations are necessary, the engineer shall make recommendations regarding the same and secure all data for preparing plans and estimates.

The approximate area of the watershed at each stream crossing should be given, if it can be readily obtained, and a note made as to whether or not the water ever overflows the road.

A tabulated list by stations of the nature of the soil shall be recorded in the back of the note book, and an entry must be made at least every 1,000 feet whether or not the character of the soil changes. A thorough effort must be made to determine the existence of unstable soil or places which are rendered unstable by water. Inquiry should be made of highway officials and occupants of adjoining lands regarding spots that break up badly in the spring and their location recorded.

Notes must be made in the back portion of the book regarding materials as follows:

The location of quarries or outcrops of rock suitable for road material and masonry.

The quality and quantity of the field stone in the vicinity of the road.

The location of gravel pits.

The available places for procuring water for roller and carts.

Samples of available stone and gravel for each road must be secured and forwarded with the survey books to the Division Engineer's office. All samples shall be marked plainly with the county, petition number, station, and name of the owner of the property where sample was obtained.

Information in regard to the following items must also be secured and recorded:

Distance to the nearest side-track or boat landing where stone may be delivered, and the name of railroad or waterway.

The most advantageous locations for a crushing plant.

Prices of laborers and teams.

Places where telford, gravel base, side drains, paved ditches or any form of special construction is needed.

CROSS-SECTIONS.

In general, objects located by cross-section measurements need not be located by transit measurements, and vice versa.

Elevations should be referred to tide-water datum by connecting with a canal, railroad or geological survey bench mark, where this can be done at small expense; and check levels must be run where existing bench marks are not found near each end of the survey.

Assumed elevations taken from the U. S. Geological Survey contour maps shall be used where no better information is obtainable.

All elevations shall be taken to the nearest tenth of a foot, except the elevations of turning points and bench marks which shall be taken to hundredths of a foot. A bench mark must be established at least every 1,000 feet.

At each 100-foot station, at each change of grade, and at cross-roads, elevations shall be taken on the base line, and at such other points on either side of the base line as may be needed to plot a true and accurate profile and cross-section of the road.

Usually the slopes beyond the fences may be merely indicated, as: down 1 in 10, level, etc., giving the approximate distance for which the rise or the fall is continuous, but in all cases where there are cuts or fills on the present road, where the road is narrow,

or where there is a probability of heavy cutting or filling in improving the road, the cross-section shall be extended beyond the fence line as far as may be needed.

The location of the edges of the beaten track, the edge of sidewalk, line of trees, top of rail-fence line, etc., shall be shown in the cross-section notes by the use of letters written under the distance figures.

All elevations upon the outcropping rock shall be noted by the letter "R" under the distance figure; and at places where rock is near the surface, soundings or borings shall be made to determine the depth of overlying earth, the reading and distance figures being enclosed in a circle when recorded to denote a boring.

Cross-sections must be taken where there are marked changes of grade at the sides of the road, even though there be no change in the beaten track.

Elevations of the ground, and of the bottom of sills shall be taken at the front corners of buildings where they are within fifty (50) feet of the base line, or beyond that distance, if a cut or fill on the improved road is liable to affect the buildings.

A cross-section shall be taken directly over each culvert and shall show the elevation of the road, top of cover, top and bottom of openings, and a profile up and down the ditch far enough to give the required information for draining from the new culvert, which is usually placed lower than the old one.

Wherever, in the opinion of the engineer in charge, new culverts are needed, he shall indicate their proposed location and size, and take a profile along the proposed location for an outlet.

Where streams enter or leave the highway at places not opposite culverts, their location shall be noted and a profile taken far enough up and down the stream to secure all information necessary in considering the advisability of planning a new drainage system.

A cross-section must be taken near each culvert in addition to the regular culvert section. This cross-section is for use in the computation of the regular earthwork, as well as the culvert excavation, and should show the general elevation of the road and land immediately adjoining the culvert and stream channel.

THE SURVEY PARTY.

A survey party will usually consist of six men and should be divided to make a location squad and a cross-section squad.

The following method of procedure should be used except where conditions are such that a better result can be secured by other methods. Changes may be made only after approval by the Division Engineer.

The location squad, after establishing a zero station, should locate a line along the road by sighting forward at some well-defined object or at a flag set as a foresight. This line should then be measured and all location measurements and notes made as the survey progresses. A temporary marker should be placed at every station for the use of the cross-section squad.

When the survey has progressed to a point where an angle becomes necessary or advisable, a permanent transit point shall be located by driving an iron pin at the end of some even foot. This shall then be referenced, a new foresight taken, and the base line carried forward as before.

The location squad shall take with a transit the azimuths of all lines run, and shall reference them to magnetic north line established at station 0. The magnetic bearing of each line shall be read and recorded as a check.

The members of the cross-section squad shall run bench levels to determine the first height of instrument and then proceed with the cross-sections, securing all information called for in these instructions.

To avoid confusion a regular routine should be followed in securing the rod readings and distances, and in calling the information to the recorder, a good method being as follows: the rodman should proceed first to the left, the instrumentman calling each reading, then the tapeman calling the distance, and then the rodman calling the nature of the point on which he held.

On turning points after the instrumentman has called to the recorder the rod reading, the rodman must check the instrumentman's reading by sliding a card or slip of paper along the rod to the reading called; then holding the rod again for the instrumentman to observe.

The rodman must keep separate notes of rod readings on all turning points and bench marks and compute the elevations of the same, and he must keep the rod on each turning point until a back sight is taken.

NEW LOCATION SURVEYS.

Where a marked improvement in line or grade can be made, where the cost of maintenance in after years can be decreased, or where the grade of the old highway is so steep that a maximum grade of seven per cent cannot be obtained with a reasonable amount of excavation and embankment, a new location of portions of the road is often advisable.

When the engineer in charge of the survey party thinks a new location is desirable, he shall promptly report the facts in each case to the Division Engineer, and unless receiving instructions to the contrary, proceed to survey a new location along the most desirable route.

Surveys of a new location will in general proceed as on the old highway, except that in determining the proper alignment and grade, lower limits of curvature and percentages of grade are usually desirable and a somewhat greater expense is justifiable to secure this result.

It is impossible to fix limits for curvature or grades which will in all cases be proper ones, for while 5 per cent may, in a large portion of the State, be a proper limit for new location grades, it is obvious that the importance of most roads in mountainous regions will not warrant the expense necessary to secure this low limit. No new location, however, shall be run on greater than 7 per cent grades, except by direction of the Division Engineer, and sharp curves and angles in alignment must be avoided.

In running a line on maximum grade several trial lines may be necessary to secure the best results and a profile shall be plotted in all cases before leaving the vicinity.

Cross-sections must be extended farther on new location than on the old highway, especially on side-hill work, as it may be advisable to move the center line in preparing plans.

Care must be taken on new location work to secure the correct names of all property owners from whom land is to be acquired and, if necessary, the county records should be consulted.

In determining the character of the soil on a new location it should be borne in mind that during construction the surface soil is removed and the character of the underlying soil, therefore, must be obtained.

Swamps, woodland, pasture, cultivated land, vineyards, etc., must be carefully noted and any data, which can be obtained, regarding cost of acquiring and clearing the same, shall also be noted.

Where a line for a new location is run so as to form a closed circuit with the base line in the highway, the azimuth of both the base line and the new location line shall be taken with a transit; and the fact that the circuit will close shall be ascertained before the field books are returned to the office.

RIGHT-OF-WAY SURVEYS.

Surveys for new right of way to be acquired will be made by a party especially detailed for the purpose. The notes will be placed in the original survey field book, if this can be done without confusion; if not, they will be placed in a new book of standard form.

The surveys are of two kinds: first, surveys of parcels of land along the sides of existing highways; and second, surveys of parcels of land where an entirely new location is proposed.

Plans and descriptions of parcels of land along the sides of the existing highway will be prepared in the office from the data of the original survey, unless the parcel to be acquired is of such irregular shape as to make its computation difficult, in which case a survey of the same shall be made in the following manner:

An enclosing transit line shall run around the piece of land along the new boundary line and the existing highway line. A magnetic bearing shall be taken at some angle where the needle will be least subject to local attraction, and the bearing of all the sides calculated from this magnetic north, the needle reading of each line being taken and recorded as a check.

The starting point of each survey shall be referenced to the base line by station number and offset distance, and also to some permanent reference point, if one is nearby.

The angle points, points of curvature and points of tangency of the new right-of-way line shall be monumented with one-inch gas-pipe rods, three feet long, or other permanent form of monument. These will be placed by the construction force when the right-of-way plan has been prepared from the data of the original survey.

In a survey, where an entire new location is to be made, the center line of the proposed road as shown on the plans shall be run with a transit, using circular curves and their connecting tangents, and following the line of the original survey except at such places as have been modified in preparing plans.

Unless a greater or less width is necessary or advisable, the strip of land to be acquired on a new location will be 60 feet wide, 30 feet either side of the center line.

One-inch gas-pipe rods, three feet long, or other permanent form of monument, shall be placed on the boundary lines of the land to be acquired at all angles, points of curvature and points of tangency.

As it is necessary to make a separate plan and description for each parcel of land acquired from each owner, the location and bearing of all intersecting property lines must be determined with care.

PLANS, SPECIFICATIONS AND ESTIMATES.

NAME OF ROAD, ETC.

Names derived from the nearest city, village, or other local feature at either end of the road, shall be assigned to each proposed improved road immediately upon receipt of the survey books; for example, the Buffalo-Hamburg Road. The names of the county and road and the petition number shall be marked on the outside of the cover of the note book in standard form. If a single petition has more than one book, number the first book the same as the petition (as 1170), and the others as follows: 1170-1, 1170-2, 1170-3, etc. The name of the road, petition number, length, etc., must be entered on the proper office records immediately upon receipt of survey books.

LENGTH OF ROAD.

Each road, after receiving a number, forms a separate contract, and if the conditions permit, should be about six miles in length. Where plans for roads less than six miles in length, and located in the same county, are being prepared at the same time, they may be grouped under one road number in order to form a contract of proper length. A long survey under one or more original petitions may be subdivided into contracts of suitable length, regardless of the petition numbers.

WORKING DRAWINGS.

Note: The following instructions regarding working drawings may be varied by the Division Engineer in minor detail to conform to the methods in use in each Division office.

Plans shall be drawn from left to right on continuous-roll, detail paper, 21 inches wide, to a scale of 50 feet to one inch. The transit or base line shall be plotted, checked and inked before plotting the details, which may be left in pencil.

Names of streams, railroads, property owners, town lines and other data, which is to be copied on the official plans, shall be lettered neatly in pencil.

Notes referring to soil, rock, walls, culverts and other data, which is not to be copied, shall be written.

Magnetic north lines shall be drawn in pencil every 15 stations.

The style of the sample plan must be followed as nearly as possible.

Profiles shall be drawn on standard, continuous-roll, cross-section paper to a horizontal scale of 50 feet to an inch and a vertical scale of 10 feet to an inch.

To avoid large rolls one-half the length of the profile may be plotted on the lower half of the paper and the remainder of the profile on the upper half.

All profiles should be checked and inked before drawing a new grade line, which may be left in pencil.

The stations and elevations of all old culverts, bridges, railroad crossings, etc., shall be shown on the profile and all notes

found in survey books regarding structures, soil, rock, intersecting highways, villages, etc., should be written on at the proper place.

Cross-sections shall be drawn on standard, transparent, cross-section paper to a scale of 5 feet to an inch, and must be checked by reading back from the plot.

The surface line, station numbers, elevations of center of present road, and abbreviations for walls, fences, tree lines, rock, etc., shall be inked neatly after checking.

The style of the sample section must be followed as nearly as possible.

GRADES.

Grade lines shall be drawn only after careful consideration of all the data available and shall be adjusted until the desired result is obtained.

The following should be carefully considered:

1. The distorted scale of the profile.
2. The relative importance of the road, the character of the traffic and the direction of heavy traffic, the maximum grade not necessarily being the same in both directions.
3. The character of the soil and old road-bed.
4. Drainage.
5. Houses, shade trees, intersecting drives, etc.
6. The recommendations of the inspection notes.
7. The avoidance, wherever practicable, of reverse grades on long hills.

It is desirable to place the new surfacing without breaking up the present traveled road-bed, and with as little filling as possible, if a reasonably smooth grade can be obtained by so doing.

"Railroad" grades, with long tangents, usually require unnecessarily expensive construction and should be avoided unless certain to economically fulfill all requirements. Long fills should be avoided wherever possible and no attempt should be made to obtain material by long shallow cutting.

There can be no fixed limit in regard to the amount of excavation per mile, but careful adjustment of the grades should usually keep it between 2,000 and 3,000 cubic yards, or even less than 2,000 cubic yards per mile.

Maximum grade is to be determined for each road separately and all controlling features must be taken into consideration. It shall be referred to the Division Engineer, if greater than 7 per cent is necessary.

Changes in rate of grade of more than 2 per cent should be eased by vertical curves of 100 to 300 feet in length, according to conditions.

Tangents should be not less than 100 feet in length, wherever practicable.

In places where doubt exists as to the proper position of the grade line a pencil note shall be made on the profile calling the attention of the engineer, who inspects the road, to the difficulty.

Care should be taken in raising the grade at either side of a bridge or large culvert so as not to endanger the structure by closing flood channels.

ALIGNMENT.

The proposed new center line shall be drawn in pencil upon the working plan as soon as determined. A good alignment is essential, but, as in grades, long tangents are not necessary, and the radii or degree of curves need not be computed (except in an entire new right of way), location being determined on the ground by offsets from the transit line.

Additional right of way should not be taken, if the alignment can be suitably adjusted within the present limits, but sharp curves or angles, especially on or at the foot of steep grades, should be avoided and right of way acquired if necessary.

The increasing use of automobiles necessitates a straighter alignment than is required for ordinary traffic, especially on the main thoroughfares, such as the New York and Albany Road. On roads of this kind all right angle turns or sharp bends should be eliminated, unless situated in villages or places where the travel must of necessity be slow.

ROAD-SURFACE.

Macadam, gravel or other road-surfacing, rolled in place, will be computed and estimated by cubical measure, deductions being made for all wooden floor bridges, railroad crossings, etc.

Width of macadam may vary from 8 to 16 feet. Under ordinary conditions 14 feet may be used as a standard width, 16 feet being used on the most important highways or in villages, etc., and 12 feet being used on the less important highways. Eight feet of macadam will be used only on the least important roads.

Thickness of macadam will be 6 inches under ordinary conditions, but a greater or less thickness may be used in special places to suit local conditions.

Maintenance stone will be computed for macadam roads,—1 cubic yard of $\frac{3}{4}$ -inch stone for every 200 feet of length of road, unless otherwise ordered by the Division Engineer.

Drives and intersecting highways will be surfaced with $\frac{3}{4}$ -inch stone (on macadam roads) and an allowance of $\frac{1}{2}$ cubic yard for each drive, and 2 cubic yards for each intersecting highway will be made. On gravel, shale or other roads, no allowance will be made for this purpose.

Width and thickness of gravel surface may be varied, within the limits given in the standard table, to suit local conditions.

SECTION OF ROADWAY.

The width of roadway is to be adjusted to suit local conditions. Under ordinary conditions the following widths of roadway for typical section "B" may be used as standard sections:

For 12 feet of macadam, 24 feet between ditches.

For 14 feet of macadam, 26 feet between ditches.

For 16 feet of macadam, 28 feet between ditches.

These widths may be reduced in rock cutting, or heavy grading, and should be increased in villages or in a wide right of way, if this can be done without greatly increasing the cost.

The standard widths given above should not be reduced more than 2 feet to keep within the present right of way, unless the cost of acquiring additional right of way is excessive.

Typical section "A" will be used on all gravel and shale roads.

Typical section "B" will be used on all macadam roads except as hereafter noted.

Typical section "C" is typical section "B" with the ditches paved and will be used wherever paved ditches are necessary with the "B" section of roadway.

Typical section "D" will be used on macadam roads with clay subgrade and in places where a considerable volume of water must be carried in the ditch. This section will not be used in villages.

Typical section "E" is typical section "D" with the ditches paved and will be used wherever paved ditches are necessary with the "D" section of roadway.

Typical sections "F" and "G" will be used only in lengths of 300 feet or more in places where the grading for a wider roadway would be very expensive. In using these sections the width of macadam should usually be widened 2 feet and 1 foot, respectively, from the regular width.

TEMPLATES.

Celluloid templates, cut to proper form and scale, may be used to draw the section of the proposed improved road upon the section of the present highway. After adjusting the quantities and determining its final position the new section should be drawn with red water color, following the style of the sample, as closely as possible.

SLOPES.

Side slopes in ordinary earthwork shall be drawn $1\frac{1}{2}$ horizontal to 1 vertical. This may be varied somewhat according to character of material to be excavated.

Rock slope in cut shall be drawn $\frac{1}{2}$ horizontal to 1 vertical, and in fill, where no hand laying is intended, 1 horizontal to 1 vertical.

In earth fills, where the difference of elevation between the crown of road and toe of slope is 4 feet or less, the side slope shall be drawn 4 horizontal to 1 vertical.

Where the material for fills is borrowed from the sides of the road, the slope from the roadway must never be less than 4 to 1.

EXCAVATION.

The planimeter may be used in determining end areas.

Regular excavation shall be computed from the cross-sections by method of end areas.

Culvert excavation shall be computed from the cross-sections, allowing 1 foot outside of side walls and deducting opening of present culvert, if any.

Wall excavation shall be computed to a slope line of $\frac{1}{2}$ to 1 from the lower back corner.

Highway and drive excavation shall be computed from cross-section, allowing a bottom width of 20 feet for highways and 12 feet for drives.

Borrow shall be computed as follows: On roads where the total regular excavation exceeds the total regular embankment, but where a borrow will be necessary in one or more sections, estimate as follows: the regular excavation in the section will form $\frac{3}{4}$ as much embankment; deduct this from the total embankment in the section and add 10% for shrinkage. Borrow will be added to the total estimate excavation, but only the regular excavation and embankment will appear in the list on the finished plans.

EMBANKMENT.

The planimeter may be used in determining end areas.

Regular embankment shall be computed from the cross-section by the method of end areas.

Culvert embankment shall be taken as 70% of the culvert excavation.

Wall embankment, or back fill, shall be computed from the cross-sections.

Highway and drive embankment shall be computed from the cross-sections, allowing a top width of 20 feet for highways and 12 feet for drives.

An allowance of 2 cubic yards of embankment shall be made for all timber and concrete ditch crossings.

ADJUSTING QUANTITIES

Under ordinary conditions excavation exceeding embankment by from 25 to 40 per cent, the excess shall be deducted from the total excavation. On new locations the excess shall be from 35 to 50 per cent. The excess shall be deducted from the total excavation and surface soil.

In adjusting quantities the greater must be reduced, wherever possible.

Quantities shall be adjusted in sections of 2,000 feet or less, and between summits or other points so chosen that the haul from cut to fill will be down-hill.

PAVED DITCHES.

Paved ditches should be estimated on steep grades, if the plans or notes show that a considerable amount of water will be carried in the ditches and that the soil is liable to wash. Under ordinary conditions wash is not liable to occur on grades of less than 5%. Paving shall be omitted for 100 to 200 feet below culverts.

Paved ditches will be used in villages if called for in the inspection notes.

Wherever it is necessary to carry the drainage across a public or private drive or a field entrance with typical sections "B," "C," "F" or "G," 12 feet (or more if necessary) of paved ditch will be used.

Paving should not be used across intersecting highways, if possible to avoid it.

Typical sections "F" and "G" require paved ditches regardless of grade.

CONCRETE DITCH CROSSINGS.

Concrete ditch crossings will be estimated for side drains at the less important intersecting highways and also at drives to public buildings or grounds where paving is impracticable owing to depth of ditch, as with typical section "D."

They are not to be used under private drives.

Quantities:

Small size, 1 ft. x 2 ft. x 18 ft. Approximate cost = \$35.00.

Concrete, 2nd class = 3.25 cu. yds., 0.155 cu. yds. per each foot added length.

Expanded metal = 54.00 sq. ft., 3.0 sq. ft. per each foot added length.

π = 2.2 sq. yds.

π = 2.0 cu. yds.

Large size, 2 ft. x 2 ft. x 18 ft. Approximate cost = \$40.00.

Concrete, 2nd class = 4.1 cu. yds., 0.192 cu. yds. per each foot added length.

Expanded metal = 54.00 sq. ft., 3.0 sq. ft. per each foot added length.

Paving = 2.2 sq. yds.

Excavation = 2.0 cu. yds.

TIMBER DITCH CROSSINGS.

Box timber ditch crossings will be estimated at drives and field entrances with typical section "D." Approximate cost = \$6.00.

Quantities:

Timber = 145 ft. B. M.

Nails = 5 lbs.

Bridge timber ditch crossings will be estimated at drives or field entrances with typical section "D," where a large amount of water must be carried in the ditch. Approximate cost = \$15.00.

Quantities:

Timber = 375 ft. B. M.

Nails = 10 lbs.

Masonry, 3rd class, laid dry = $\frac{1}{2}$ cu. yd.

GUARD-RAIL.

Guard-rail will be estimated where the cross-section shows a difference in elevation of 4 feet, or more, between the crown of the road and the toe of slope, and along creeks and dangerous places.

Twenty-four feet, each side of highway, will be estimated at culverts not provided for under the foregoing clause.

Existing guard-rail will be disregarded, unless noted to be of exceptionally good construction.

Pipe-rail will be used only in places where timber construction is impracticable.

Rustic guard-rail will be used only where directed by the Division Engineer.

GUIDE-BOARDS.

Guide-boards will be estimated at the intersections of all important public highways with the road to be improved. Inscrip-

tions, showing places to which the State road and intersecting roads lead, with distance scaled from the U. S. Geological sheets to the center of cities or villages, shall be prepared in proper form.

In preparing inscriptions the nearest village along the State road, especially if it is a small one, need not be given on every guide-board, a better arrangement being to omit this village on every other board and give the name of the nearest large city or village beyond. At an intersecting road both a nearer small village and a more remote larger village or city may be given.

All distances must be given to the nearest $\frac{1}{4}$ of a mile and no fractions except quarters and halves shall be used.

ROAD-SIGNS.

A standard road-sign will be placed on each guide-board post and need not be included as a separate item in the estimate.

Where the guide-board posts are more than approximately $\frac{1}{4}$ mile apart a standard road-sign and post will be estimated each $\frac{1}{2}$ mile.

WALLS.

Unless local conditions make some other construction advisable, 3rd class masonry, laid dry, shall be estimated for bank walls; and 3rd class concrete, or 3rd class masonry in cement, for walls sustaining the road or earth deposited behind them. All walls shall have a batter of 3 inches to 1 foot on the face or exposed side and shall be estimated as extending two feet or more underground in all cases except on rock.

TELFORD BASE AND UNDERDRAINS.

Telford base and underdrains will be estimated where called for in inspection notes.

CULVERTS.

Concrete design for culverts will be used in all estimates.

The location and size of culverts will in general be as directed in the inspection notes. Both should be checked with all available data.

The size of all large culverts should be approximately checked by scaling the drainage area and applying several of the more common run-off formulæ for small areas.

No culverts over 30-foot span will be estimated to be built and none over 15-foot span should be estimated, except after most careful consideration as to the necessity of a new structure.

Plank-floor design should be avoided.

In general, when a new I-beam and concrete top is necessary on a large culvert, the existing abutments should also be rebuilt, as they are seldom of suitable construction.

The length of culverts shall be obtained by plotting the culvert on the cross-section and plans. Length of culverts, with the minimum amount of headroom, may be taken from the standard table of minimum lengths.

Existing culverts, permitting approximately two feet of shoulder on each side of the road-surfacing, need not be lengthened if otherwise satisfactory.

Drop inlets shall be estimated and specified in villages and at all places where a standard inlet would require excessive excavation.

PRELIMINARY INSPECTION.

Before the completion of the plans for its improvement, each road shall be inspected by an experienced engineer detailed from the office force. This is for the purpose of observing the probable effect of the proposed improvement, and of determining the proper arrangement of the drainage system, or any other details which may be a matter of doubt during the preparation of plans.

The inspection will be made after the plotting has been completed and a new grade line has been approximately established, although at the discretion of the engineer in charge of the preparation of plans it may be delayed until after the balancing of quantities.

Before commencing an inspection the information obtained by the survey party should be reviewed and note made of any failure to secure full information.

The kind and location of available road material should be investigated thoroughly, regardless of whether or not the survey party secured information.

The profile and the transit book must be carried on all inspections and all notes must be entered legibly in the back portion of the book.

The best results can be obtained by walking over the road and using livery only to arrive at or leave the end of the road.

Recommendations must be made in every case in regard to the following matters:

1. The kind and width of surfacing and the typical section to be used in improving the road.
2. The location and size of all new culverts and the action to be taken, in each case, regarding old culverts.
3. The changes necessary or advisable in the new grade line, as drawn upon the profile.
4. The location of all necessary underdrains, telford base, deep ditches, or other construction necessary to secure a firm subgrade.

The desire of the local supervisor or other officials in regard to the nature of the improvement should be learned, but no assurance regarding the action of the State Engineer shall be given.

RIGHT OF WAY.

The boundaries of all additional right of way to be acquired shall be drawn on the working plans and traced upon the official plans. A tracing, showing each parcel and giving a description of the same, shall also be prepared in standard form for each separate piece to be acquired.

All areas shall be given to the nearest hundredth of an acre and all dimensions to the nearest tenth of a foot.

OFFICIAL PLANS.

All official plans shall be drawn in standard form on sheets of tracing cloth of standard dimensions, viz., 24 x 36 inches outside dimensions, with 1½-inch borders except on the left, where a 2-inch border shall be placed.

They shall show progressively from left to right a map and profile of the present road and of the proposed improved road, and also the character and location of each detail of the proposed improvement.

The first sheet shall contain a location map in the upper left corner and a standard form title in the upper center and all sheets shall contain a standard stamp in the lower right corner, to receive official signatures.

Standard, detail white prints shall be attached to each set of plans.

The style of the sample plan must be followed as nearly as possible.

ESTIMATES.

Duplicate estimates on standard forms, with titles similar to the plans, must accompany all official plans.

An allowance of approximately 10% shall be added to each estimate opposite the item. "Plans, Engineering, Inspection and Advertising."

Standard estimate prices shall be used unless local conditions make some changes advisable.

The estimated price of macadam shall be computed on standard form.

The estimate price of excavation of all kinds shall be obtained by computing the sum of the estimated earth and rock excavation at 40 cents and \$1.50, respectively, (these figures may be varied somewhat to suit local conditions) and dividing this sum by the total number of cu. yds. of all kinds.

On embankment roads the estimate price for embankment shall be computed as follows:

Compute the estimated rock excavation at \$1.50 per cu. yd. and the earth at 40 cents per cu. yd. (These figures may be varied somewhat to suit local conditions.)

Assume that the rock excavation will form the same amount of embankment (this allows for filling interstices) and that the earth excavation will form $\frac{3}{4}$ as much embankment.

Find the remaining amount of embankment to be formed from borrowed material, and assume a price for this embankment according to haul and initial cost.

Add this estimate to the rock and earth excavation estimates, and divide this total by the total number of yards of embankment to obtain unit price.

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SPECIFICATIONS.

Duplicate specifications on standard forms, with titles similar to the plans, must accompany each set of official plans and all necessary data and quantities must be inserted in the proper spaces.

CONSTRUCTION.

Engineers assigned to construction duty will be held responsible for the construction of the road in accordance with the plans and specifications, from which there is to be no deviation without the consent of the Division Engineer.

While on construction duty, engineers and their assistants should board as near the work as possible and no transportation bills must be contracted, unless authorized by the Division Engineer.

Engineers and their assistants must not leave the work during working hours without the consent of the Division Engineer, unless it be upon some business connected with the work.

Immediately upon assuming charge of a contract, the engineer shall carefully check the levels and measurements for the entire length of the road and mark on the adjacent fences, telegraph poles or other permanent objects in white lead paint each full station number, where this may be done without damage to private property. If the even station does not come opposite the permanent object the plus station shall be marked. If discrepancies are found to exist in levels or distance, prompt notice shall be sent to the Division Engineer.

The cross-section of the road must be as shown on the plans.

The grade and alignment shall be given in the following manner:

Set stakes on each side of the highway at every station, or more often if necessary, and near the fences or other permanent objects, where they are not liable to be disturbed.

Prepare two small note books in ink, giving the horizontal distance from each stake to the center line of the macadam, and the vertical distance from the top of each stake to the crown of the finished macadam. After these note books are checked, one shall be retained by the engineer in charge and

the other shall be given to the foreman in charge of the grading, so that he may set his own intermediate grade stakes.

At times when the engineers are not needed elsewhere these intermediate stakes shall be set by them.

If, to secure better results, any work in addition to that provided by the plans is thought necessary or advisable by the engineer in charge, a careful plan and estimate of the cost of such extra work should be prepared and the whole matter submitted as soon as possible to the Division Engineer.

Engineers should observe carefully the drainage of the entire road especially during or after heavy rainstorms, and any changes in location or size of culverts or ditches that are considered advantageous should be brought at once to the attention of the Division Engineer. Attempt should also be made during wet seasons to discover all soft and poorly drained portions of the road and if, in the opinion of the engineer, these places are not properly provided for in the plan the Division Engineer should be promptly notified.

The contractor must not be permitted to do any work on a new location, until the land has been acquired by the proper authorities.

Endeavor must be made to maintain friendly relations with the people living along the road and with the local officials in the county and town. Also, wherever possible, the road shall be kept open so as to inconvenience the traveling public as little as possible.

No engineer shall give any advice to contractors as to whether or not they can safely take their road rollers or other equipment over bridges. The contractors must assume all risks for such crossings.

Standard forms of specifications and plans are changed from time to time and it is absolutely necessary that all employees shall study the specifications and plans and be fully informed as to all their requirements.

FORMING SUBGRADE.

In forming the subgrade for the macadam, stakes shall be set every fifty feet, or more often if necessary, along the line of the edge of the macadam and the finished grade marked thereon. The proper form can then be given to the subgrade by means of a string

stretched longitudinally between stakes, and by a template conforming to the desired cross-section of the subgrade.

The elevation of the subgrade shall be checked before any stone is laid.

Before any subgrade is prepared for the macadam, all embankment and excavation shall be made for the full width of roadway. On embankment the portion outside the macadam shall be thoroughly rolled and consolidated before the trench for the macadam is formed. In excavation all drainage ditches shall be excavated before placing the macadam, in order to thoroughly drain the work during the construction.

Care should be taken to give the subgrade a sufficient amount of crown, so that after the road is rolled and completed it will have the full crown shown on the plans. This result can best be obtained by raising the center of the subgrade two or more inches to allow for settling while the stone is being rolled, leaving the sides as indicated on the plans. If the contractor objects to this method, he should be informed that, if the finished road has not the desired crown, it will have to be supplied with additional macadam. This precaution is especially needed upon a yielding or plastic soil, which is likely to flatten under the action of the roller or the traffic.

The result to be obtained, when forming the subgrade, is a firm and solid foundation upon which to place the macadam,—one that will not weave under the action of the roller, and upon which the stone may be bound and locked together. This can be obtained only by following strictly the specifications for "Excavation."

When unstable material is of too great an extent to be entirely removed, the facts should be reported to the Division Engineer, with a detailed description of the extent of the same and with suggestions as to the proper treatment thereof.

On the clay soil frequently encountered in New York State it is absolutely essential that the subgrade be so formed as to prevent the clay working into the interstices of the stone during the rolling of the macadam. This can best and most economically be accomplished by placing a layer of gravel upon the clay subsoil, if a bank can be found within hauling distance. A layer of $\frac{3}{4}$ -inch stone or screenings will often give satisfactory results, where no

other material is available, and in the more unstable places a layer of field stone, varying in size, with the larger at the bottom, may be used.

During dry weather a subgrade of clay may be firm and hard, but immediately upon being wet it may become very soft, and it should be borne in mind that the sprinkling and puddling of the macadam often causes the latter condition; hence the necessity of providing against the clay working into the macadam.

On sandy soil, rolling has little effect and should be continued only long enough to settle the subgrade in place. If the sand is very fine, or is quicksand, a layer of gravel, which can frequently be found in the vicinity, is the best treatment possible and will usually give as firm a subgrade as is desired.

CULVERTS.

Masonry design may be submitted for concrete design at the option of the contractor.

The parapet and wings of culverts should be built as shown on the plans; the height of parapet above the top of cover being the same in all cases,— 9 inches.

In setting culverts of minimum length where the channel is practically level, a fall of about three inches should be allowed in the culvert and the shape of the shoulders of the road may be varied slightly to bring the slope lines to the proper places.

Where a culvert is under more than the minimum amount of embankment either at one end or at both ends, the culvert will be lengthened beyond the minimum length instead of raising the parapet and wings to hold the slope.

It is not necessary in any case that the elevations of the tops of parapets be the same; for if so placed, the one on the down-stream side usually appears higher than the other.

QUARRIES.

If a quarry, after being developed, contains layers of slate, shale, thin layers of soft stone or undesirable stone of any kind, the contractor shall be required to select from the general run only such stone as will comply with the requirements of the specifications and contract.

If, in the opinion of the engineer, the quarry should be discontinued as a source of supply, the contractor shall be directed to suspend immediately and a report shall be sent at once to the Division Engineer.

FIELD STONE.

Where "local stone" is permitted by the contract and the contractor proposes to use field stone rather than stone from quarries, it will be necessary in order to secure compliance with the requirements of the specifications to observe the following directions:

The stone must be *selected* from the general run of stone found in the fields and stone walls or fences; those used shall be hard, durable and of compact texture, and all disintegrated stone, as well as soft sandstone, shale and slate, must be rejected. Where the field stones are of the flat variety, the minimum thickness allowable for use is two (2) inches, and where the stones are round cobbles, the minimum diameter allowable is five (5) inches unless otherwise ordered by Division Engineer. It will, therefore, be seen that old walls or fences can not be cleaned up entirely in crushing for macadam.

When the quantity of harder stone is insufficient for the whole road the softer stone may, if of approved quality, be crushed and used for the lower course. This must not be allowed without the approval of the Division Engineer in each case.

CRUSHING.

The engineer in charge should frequently note the working of the crusher, in connection with the inspection of the crushed stone. If the product seems to run smaller than the screen should give, it may be due to the section of the screen being too short, or the screen may turn too fast, or it may have too great an inclination. The bins are often allowed to get too full and stone from one bin will run over into another.

The engineer shall not only insist that the crushed product accords with the specifications, but he may point out the probable reason for the stone not being of the specification sizes, if such be the case.

The specification requirements regarding crushed stone must be rigidly enforced.

COURSES.

The thickness of the courses of stone must be regulated by the use of several hardwood blocks, laid on the subgrade or on the next lower course, as the stone is being spread. These blocks will be one and one-third the required thickness of the course to be formed and the loose stone must be spread to the full height of the blocks.

SPREADING SCREENINGS.

The contractor must not be allowed to haul heavy loads of screenings over the stone which has been placed, until the latter has been sufficiently filled and rolled to prevent its being displaced by so doing.

Where it is impossible to drive along the side of the macadam and spread the screenings directly from the wagon, it will be necessary for the contractor to dump sufficient screenings along the shoulder before the stone has been spread and rolled.

ROLLING AND FINISHING MACADAM.

In the preliminary rolling of both courses the large wheel of the roller should lap out onto the shoulder about eight inches, and after traveling the length of the portion to be rolled, the roller should cross over and return in the same manner on the other side. Avoid crossing from one side to the other on unrolled portions.

The rolling of the bottom course should be continued until the stone are firmly locked together, and do not weave to any extent ahead of the roller, or are not moved by the action of the feet in walking over the macadam.

Where the top-course stone must be hauled over the bottom course, the latter should be well filled and rolled to sustain the travel.

No more water should be used on the bottom course than is necessary in preparing it to sustain the travel of hauling the top course thereon, without cutting or ravelling. In most cases the desired result can be obtained by dry rolling.

Where the subgrade is of clay, especial care must be taken not to soften it by the application of too much water, and in the final rolling the stone should not be saturated as specified, but should be treated in the following manner: Sprinkle the stone about twice over or just sufficient to wet it without reaching the subgrade. Then roll several times and leave until the next day, and repeat this operation from day to day until the desired result is obtained.

Under no circumstances shall any driving be allowed over the stone after the screenings have been spread, until the section shall have been given the first puddle, as described in the specifications. If the top-course stone is delivered faster than it can be rolled and puddled, it may be spread and filled, but must not be driven on until puddled and rolled.

It is seldom feasible to get any portion of the road thoroughly filled and puddled at the first operation. If, after the greater portion of the surface is filled with "grout," the road is left for several days to partially dry out, and then is again rolled and more screenings added, the final result can be obtained with less rolling and wetting than if attempted at one operation.

Any depressions or hollows developed during rolling or puddling shall be filled with stone of the same size as the course being treated and the same shall be thoroughly incorporated with the course before proceeding.

Sections of the road may be opened to travel as soon as completed in dry weather, but in wet weather, when the travel brings on mud, the road should not be opened in short sections, thus reducing to a minimum the number of places where mud is carried onto the road.

GUARD-RAIL.

In setting guard-rail the distance from the center of the road to the face of the posts shall be equal to one-half the width of the road-surfacing, plus two-thirds the width of the shoulder. Exceptions to this rule will be made in setting short stretches of rail over culverts and in setting the end posts of all stretches.

At culverts where only 24 feet of guard-rail is used, the face of the middle panel shall be at the inside face of the parapet.

The end posts of all stretches of guard-rail shall be set at a

distance of one-half the width of roadway from the center of the road and the entire top rail shall be a uniform distance above the center of the road.

In setting the top rail a uniform side slope of three inches in six inches shall be used instead of allowing a three-inch slope regardless of the width of the top of post. A guide for sawing the tops of the posts, similar to that used by carpenters in sawing miter joints, is the simplest method of securing this result.

INSPECTION.

There must be constant inspection of all work and materials during the entire time the construction is in progress and the following items shall be given especial attention:

The thickness of each course of stone must be constantly watched by the engineer, or one of his assistants, during the entire time of spreading.

The mixing of all mortar and concrete must be constantly watched to insure proper proportions and methods. In placing concrete it is very important to have the forms securely braced, so as to prevent any movement or misplacement. Masonry or concrete laid in warm weather should be protected from the sun by covering with burlap, grass or other satisfactory material, and kept damp until it has thoroughly set.

Sand used for mortar or concrete must be carefully inspected, and if found to contain an injurious amount of foreign matter, it must be washed before using. Washing should be done by stirring the sand in running water.

Paving must be watched to insure proper size and shape of stone and form of ditch. Care shall be taken to have the edge of the paving nearest the macadam slightly lower than the material of the shoulder, otherwise the paving will cause the water to follow along its edge, forming a ditch in the shoulder and tending to undermine the paving.

Paving across drives or highways must be so formed that vehicles can pass over it without danger or inconvenience,

CEMENT.

No cement shall be used until it has been tested and accepted. Samples of cement shall be placed in paper bags, furnished upon application by the Cement Testing Laboratory, Department of State Engineer, Albany, N. Y., to which the samples shall be sent immediately after taking and which shall be notified by standard notification cards when each package is forwarded. A notification card shall also be enclosed in each package.

The contractor shall be informed that the cement he proposes to use on the work must be furnished with a view of being held for the 28-day test, as prescribed in the standard specifications, for only those showing very satisfactory tests will be allowed to pass on the seven-day tests alone.

Storing.— Care shall be taken to have the contractor provide a dry place, protected from the elements, for the storing of cement, and attention is called to the clause of the specifications requiring that each shipment and each car lot shall be kept separate. This will enable the removal of any one lot in case of its rejection without causing the removal of a larger quantity.

Selection of Samples.— Samples shall be taken by the engineer, or his representative, promptly on delivery, from every tenth barrel, or from the equivalent of the tenth barrel when packed in sacks. Each sample shall be taken to include cement from the surface to the center of the package sampled, and shall be sufficient to fill the sample bag provided by the Cement Testing Laboratory.

Numbering and Marking.— Each barrel or bag sampled shall be numbered consecutively throughout the progress of the work and its sample shall be marked in the same manner with the same number. Each sample shall also be marked with such information as is required on the label for the bag.

Results.— Results of tests may be expected in ten days from the seven-day test, and in thirty days from the 28-day test, but no cement shall be used until notice of acceptance shall have been received from the Division Engineer.

Rejected Cement.— Any cement which has been rejected by the Department, because of failure to stand the required tests, shall be immediately removed at the expense of the contractor, under the general direction and in the presence of the engineer in charge.

FINAL NOTE BOOKS.

For the purpose of making monthly and final estimates and for permanent record after the work is completed, all quantities, except as hereinafter noted, must be recorded, as the work progresses, in standard note books furnished by the Division of Engineering.

Separate headings shall be made for each item of work on sample pages furnished under each heading. The given or stations shall be noted under each heading and the used in each item. The item were recorded in the structure shall be made in the book. The structure as described.

The items recorded in the book shall be the in the "Engineering" of Quality. The data must be given.

Clearing and Grading.—Give the station and number of acres.

Excavation or Embankment.—Give the show by stations any and section.

Macadam.—Give the width, thickness and amount.

Concrete.—Give the station and refer to page.

Base, Pavement.—Give the station and refer to page.

Flagging.—Give the station and refer to page.

Pipe.—Give the station and refer to page.

Steel, Cast Iron.—Give the station and refer to page.

Guard, Bridge and Fencing.—Give the station and refer to page.

Guide-Boards and Road-Signs.—Give the station and refer to page.

Where each post was erected and

Drawings to approximate scale of each structure must be shown, as on the sample page, with all dimensions and computations and a list of all items and amounts in each structure.

When the work is completed, a general summary of all items shall be made in the back portion of the book and a final account shall be compiled. This account must show the exact quantity of every item used in the construction of the road.

All final notes must be entered neatly and legibly in ink in such a manner that they can be easily interpreted after the work is completed.

Final note books must be kept as a part of the permanent records of the office of each Division Engineer.

ACCEPTANCE.

After the completion of a road and before notifying the Deputy State Engineer of its completion, the Division Engineer shall cause a profile of the center of the road to be made by a reliable employee not engaged upon the construction of the road. This profile shall be plotted upon the original working profile or upon a set of original blue prints in such a manner that it may readily be compared with the original profile and a written certification as to its correctness shall be placed thereon by the engineer making the same. In like manner an occasional cross-section shall be made at the places of the heavier cuts and fills. This data must be presented for inspection of the Deputy State Engineer when making his final inspection of the road.

The Division Engineer shall furnish the necessary tools and labor required to dig up the macadam and thereby disclose the thickness of the courses at such places as are designated by the Deputy State Engineer when making his final inspection.

Albany, October 1, 1906.

HENRY A. VAN ALSTYNE,
State Engineer and Surveyor.



THE GOOD ROADS QUESTION.

**A PAPER READ BY HENRY A. VAN ALSTYNE, STATE ENGINEER, AT CORNELL
UNIVERSITY, MAY 17, 1905.**

The Good Roads Question.

As soon as a people emerge from a pastoral and nomadic life the construction of artificial ways or roads becomes a necessity. One of the first steps of civilization is to open up a country by roads, to permit the unrestricted movement of people and commodities. The natural resources of a country cannot be developed, nor the social well-being of its people advanced, unless adequate means of communication are provided. In order to meet the requirements of modern civilization, not only must there be means of communication, but the means must be such as to permit of the movement of commodities at the lowest possible cost, and of people at the highest speed and with the greatest possible degree of safety and comfort.

The difference of a fraction of a cent per ton per mile in the freight rates to markets on the products of many business enterprises means the difference between profit or loss, success or failure, for those interested in the undertaking. In 1904 the railroads carried through New York state the equivalent of five billion, six hundred and forty-six million, four hundred and thirty-five thousand (5,646,435,000) tons one mile of local freight, and twelve billion, nine hundred and forty-five million, one hundred and five thousand (12,945,105,000) tons one mile of through freight. The average freight rate on the railroads of New York state in the year 1865 was three and one-quarter cents (\$.0325) per ton per mile. The average freight rate in the year 1904 in New York state was seventy-three hundredths of a cent (\$.0073) per ton per mile. This would make a saving of two and fifty-two hundredths of a cent (\$.0252) per ton per mile in the average freight rate during the last forty years on the railroads of New York state. This means that if the people using the railroads of New York state last year had to pay the same railroad rates on freight that prevailed in 1865, they would

have to pay over one hundred and forty-two million dollars more for their local freight and over three hundred and twenty-six million dollars more for the through freight which passed through New York state than they did actually pay in the year 1904. The figures should convey some idea as to the immense saving made in a single year by the improvement of the private highways of the state, which has been effected during the last forty years by private enterprise.

Hundreds of millions of dollars have been spent during the last decade in improving the railroads of the country. We are now, and have been for a number of years, in the midst of an era of railroad reconstruction and improvement; the improvements consisting of eliminating sharp curves, shortening distances, reducing steep grades, laying heavier rails, building stronger bridges, etc., to permit the use of heavier engines, rolling-stock and train-loads. The American railroads are managed by the most shrewd, capable and far-sighted business men in the world. They consider that true economy demands the best roads that they can build in order to reduce to the lowest possible point the cost of operating their properties and transporting and carrying passengers and freight. They expend hundreds of millions of dollars in increasing the size of their rolling-stock and the train-loads they can draw, and in decreasing the amount of power and human labor expended on each ton of freight moved.

According to the United States census reports, the products of New York state amount each year to the following:

	Tons.
Agricultural products, about	14,000,000
Manufacturing products, about	6,500,000
Mine and quarry products, about	8,500,000
Forest products, about	2,000,000
Merchandise, chemicals, liquors, etc., about	2,500,000
Total	33,500,000

A rough check on the agricultural products can be obtained by assuming that each of the twenty-four million acres of farm land in New York state produces half a ton annually, or about twelve million tons of agricultural, marketable products each year.

The railroads and canals carried through New York state in the year 1904 about one hundred and thirty-seven million tons of freight, of which forty-three million tons were local or way freight.

Of course, there is a very large tonnage passing over the wagon roads which is not included in any census report or in any railroad or canal record of local or way freight. None of the agricultural, quarry and forest products, etc., drawn directly to the local markets in villages and cities, or to docks on the Hudson and St. Lawrence rivers, and on Lakes Erie, Ontario and Champlain, nor the merchandise, fertilizers, liquors, etc., carried away from these local markets and docks are included in any record of local or way freight carried by the railroads or canals.

Taking the above facts into consideration, it seems very conservative to assume that at least forty million tons of commodities are carried over the wagon roads of New York state every year. The Department of Road Inquiries of the United States Department of Agriculture published a circular a few years ago, in which it is stated that the average cost of wagon transportation in New York state is twenty-six cents per ton per mile, and that the average length of haul is about six miles. The average cost of hauling commodities to markets or shipping points in European countries, provided with a system of good, hard roads, as collected by the United States consular agents and published by the United States Department of Agriculture, is about ten cents per ton per mile. On this basis, if the roads of this state were improved until they were equal to those of the European countries considered, there would be a saving of sixteen cents on each ton moved one mile, or ninety-six cents on each ton moved the average haul of six miles.

While the accuracy of the figures contained in the above mentioned circular published by the United States Department of Agriculture has been questioned, there is no reason why they may not be as reliable, as approximate estimates, as any produced by their critics. It is not possible to determine accurately the amount of money that will be saved by the improvement of the main highways of New York state; but assuming that at least forty million tons are carried over these wagon roads some

distance each year, some idea of the possible saving and of the great importance of this subject may be found from the following table, which shows the amount saved in the transportation of forty million tons in one year, estimating the average haul to be from one to six miles, and calculating the saving in the cost of transportation to be from one to sixteen cents per ton per mile:

Amount Saved in Moving Forty Million Tons in One Year.

REDUCTION IN COST PER TON PER MILE.	AVERAGE HAUL.					
	1 Mile.	2 Miles.	3 Miles.	4 Miles.	5 Miles.	6 Miles.
\$0.01	\$400,000	\$800,000	\$1,200,000	\$1,600,000	\$2,000,000	\$2,400,000
0.02	800,000	1,600,000	2,400,000	3,200,000	4,000,000	4,800,000
0.03	1,200,000	2,400,000	3,600,000	4,800,000	6,000,000	7,200,000
0.04	1,600,000	3,200,000	4,800,000	6,400,000	8,000,000	9,600,000
0.05	2,000,000	4,000,000	6,000,000	8,000,000	10,000,000	12,000,000
0.06	2,400,000	4,800,000	7,200,000	9,600,000	12,000,000	14,400,000
0.07	2,800,000	5,600,000	8,400,000	11,200,000	14,000,000	16,800,000
0.08	3,200,000	6,400,000	9,600,000	12,800,000	16,000,000	19,200,000
0.09	3,600,000	7,200,000	10,800,000	14,400,000	18,000,000	21,600,000
0.10	4,000,000	8,000,000	12,000,000	16,000,000	20,000,000	24,000,000
0.11	4,400,000	8,800,000	13,200,000	17,600,000	22,000,000	26,400,000
0.12	4,800,000	9,600,000	14,400,000	19,200,000	24,000,000	28,800,000
0.13	5,200,000	10,400,000	15,600,000	20,800,000	26,000,000	31,200,000
0.14	5,600,000	11,200,000	16,800,000	22,400,000	28,000,000	33,600,000
0.15	6,000,000	12,000,000	18,000,000	24,000,000	30,000,000	36,000,000
0.16	6,400,000	12,800,000	19,200,000	25,600,000	32,000,000	38,400,000

The immediate financial profits are by no means the only benefits to be derived from the construction of good roads. It would be difficult to mention all the advantages to this state that would arise from a system of good roads, such as is possessed by France, properly constructed and maintained. Social and business intercourse among the people living in rural districts, and between them and those people living in urban communities, is promoted and made more enjoyable. Every year the proportion of people comprising the immense city populations, which seeks a temporary or permanent home in the country, is increasing. If the rural districts of New York are open to, and made accessible, attractive and desirable for city people in search of country homes, a large proportion of these people (with their money) will be induced to come to New York state instead of to New Jersey, New England, European countries and other places where they now go in search of health, pleasure and the various attractions of rural life. The *New York Times* recently stated that the apparently large balance in trade in favor of this country is prac-

tically offset by an estimated expenditure of \$300,000,000 a year made by American tourists to Europe.

Again, the farmers of New York state cannot now successfully compete with the farmers of the West in raising grain and similar crops, which must be hauled to market, and whose weight is only about one-half a ton per acre. If they change to fruit, vegetables and similar crops the weight of their marketable product is increased to eight or twelve tons per acre. With this large increase of weight necessary to be hauled they should have better roads, and roads that are in good condition every day in the season, in order to permit them to market the perishable crops when their condition demands it. Roads that are in good condition every day of the year permit a wider choice in time for the marketing and a wider choice of market. They also make the marketing possible when prices are the highest. The consolidation of small, inefficient schools into graded schools, capable of being managed with greater economy and efficiency, is made possible by roads that are in good condition every day in the year.

Every community in our state would be made more prosperous and also more desirable and attractive as a place of residence, if, by the possession of good, hard roads every day in the year, facilities were afforded both for getting its products and supplies to and from market at the lowest possible cost, and also for pleasure driving and all other purposes.

Most of the early roads of New York state were merely strips of land along Indian trails, or were selected without any effort to obtain the shortest distance with the best possible grades between the points connected. They were constructed without any comprehensive or systematic plan as to grade or alignment, and all succeeding generations have been climbing over the highest hills, and through the deepest valleys, a large proportion of which could have been avoided if the public roads had been located with the same care and engineering skill that has been employed in the location of railroads owned by private corporations.

In 1797 the Legislature, by means of lotteries, authorized certain commissioners to raise certain sums of money to be expended in opening and improving certain "Great Roads," as they were called. Private capital was invited to assist in opening and maintaining many of the main highways, the idea being bor-

rowed from England. Between 1797 and 1860 over four hundred charters were granted to different turnpike companies by special acts of the Legislature, authorizing them to build and maintain roads known as turnpikes, and to collect tolls for every passing vehicle and animal. In return they were supposed to keep the turnpikes in good repair. These toll roads usually had a surface of gravel, broken stone or plank, and in some few instances stone trackways were laid. Many of the turnpikes proved unprofitable, as investments, and very few of them were properly maintained. The people using the roads objected to paying the tolls and considered them unjust and a nuisance, especially in some localities, where their neighbors, trading in the same market, escaped the toll by being located where they could use free public roads. The turnpike roads became unpopular and the system was not a success; most of the companies surrendered their charters and abandoned the roads or sold their rights to the towns. At present only a few miles of road in New York state are operated under this system.

In 1898 there were in New York state about seventy-four thousand miles of wagon roads outside of incorporated cities and villages. Only a very small portion of these are located in such a manner as to provide the best grade and alignment, and quite a large proportion have the worst that could be obtained. On a large portion of these roads no effective drainage exists, and considerable portions of them, in the spring and fall and after very heavy rain-storms, are merely elongated mud puddles or sink-holes. All of the roads, except a very small portion, have a dirt surface usually formed by sods, mud, dust and other wornout material that has been scraped or thrown into the road from the ditches. In the main the roads are in a very unsatisfactory condition; they are very much inferior to those of civilized countries in other parts of the world; many of them are impassable for a loaded wagon in the spring or fall or after a heavy rain. Comparatively a small portion of them are in a condition to be used with any degree of comfort or pleasure for the whole twelve months of the year. The average cost of transportation over them is at least twice the cost of transportation over roads such as those possessed by France.

This unsatisfactory condition of our roads is due to a century's trial of two systems of road administration—the local town-control, or labor-tax system, and the private-capital control of toll roads. This toll tax on the traffic using the road was imposed on the theory that the people using the road should pay for its construction and maintenance. This system is practically abandoned now and was justifiable only in a new country where the taxable property adjacent to the road was very small. This system is not in harmony with modern ideas. It is no longer considered wise, nor is it good practice, for a city or village to have its water-supply or sewage system under the control of private capital. The question of municipal control of gas and electric lighting, and even of street-railway systems, is now receiving favorable consideration in all parts of our country.

Under the local town-control or labor-tax system, the cost of maintaining practically all the wagon roads of the state is borne by the towns in which the roads are located; these towns have less than twenty per cent of population and less than ten per cent of the total valuation of the entire state, and this cost is almost entirely assessed upon the real property in the towns. The total value of the labor annually assessed (although not always furnished) on the country towns of the state, for highway maintenance prior to 1898, is estimated at about three million dollars. This labor was supposed to be performed under the direction of one, two or three highway commissioners in each town, elected by the people for a term of two years, and who were, consequently, frequently changed. The highway commissioners are seldom selected or retained because of their fitness for their duties. Their tenure of office is so uncertain that there is really no inducement for them to qualify themselves for their important work by special study or preparation. They usually devote only such time to their official duties as they find convenient to spare from their farm or from other private business. Such a system places a premium upon inefficiency. If the elective highway commissioner honestly endeavored to force his neighbors to furnish a full, hard, day's labor for each day assessed, he would probably be retired at the next caucus or election for an easier boss. In general, working out the road tax was regarded as a holiday, where any attempt was made to work it out.

After a trial of a hundred years and the expenditure of over a hundred million dollars in tolls and labor assessments, the toll-road system and the local town-control, or labor-tax system, have failed to produce satisfactory results. The wagon roads of New York state, constructed and maintained under these systems, were not in much better condition in 1898 than they were when first built. Besides this the people of each generation who used them have been subjected to inconvenience and discomfort and have paid a mud and ignorance tax aggregating many millions of dollars, which could have been saved and avoided if these roads had been properly located, constructed and maintained under a wise, comprehensive and systematic plan.

It is seen that under the systems of road control, prevailing prior to 1898, the cost of all work on the seventy-four thousand miles of wagon roads of the state was met by three forms of road tax.

First. A tax on the people using the toll roads.

Second. A poll tax on the voters of each town (only partly collected), comprising less than twenty per cent of the total voters of the state.

Third. A property tax in labor or cash on the real property of each town, aggregating less than ten per cent of the total valuation of the entire state.

In 1898, following the example set by New Jersey in 1891, Massachusetts in 1893 and Connecticut in 1895, there was inaugurated a new departure in road administration in New York state,—that of state aid in road construction and maintenance. The Legislature of 1898 enacted the Higbie-Armstrong and Fuller-Plank laws. Doubtless these laws are destined to work most important and radical changes in highway improvement and to promote the general prosperity and welfare of the state. With the subsequent amendments and supplemental laws, they provide a wise, comprehensive and systematic plan for the improvement of the wagon roads of the state. The framers of this law were wise enough not to attempt to revolutionize in a day a system that had existed for a century or to force a new system upon the conservative, rural towns against their wishes.

These state-aid laws are not forced on the people, but they take effect and become operative only at the option of those con-

cerned,—on the request of the board of supervisors of a county in the case of the Higbie-Armstrong law, and by a majority vote of the town desiring the money system of maintenance in the case of the Fuller-Plank law. To induce the supervisors of the county and the voters of the towns to take advantage of these laws and place them in operation by their vote, a campaign of education was inaugurated. A Good Roads Convention has been held in Albany each year for the last six years, to which the State Engineer has invited the supervisors and others from every county of the state. Good roads associations were formed and meetings have been held in many counties by their most public-spirited and influential citizens. Meetings of the boards of supervisors and meetings of the State Grange have been addressed and the new road laws have been interpreted and explained by representatives from the State Engineer's Department. Nine different bulletins, prepared in the State Engineer's office, have been published, and the reports of the proceedings and recommendations of the Standing Committee of the Supervisors' Annual Convention have been distributed throughout the state by the thousands; and last, but not least, the press of the state has assisted in creating the *demand by the people for improved roads*, which must be first brought into existence before any general, state-wide plan can be placed in successful operation.

By the terms of the Higbie-Armstrong law the state invites every county to improve its more important highways, and, as an inducement to accept the invitation, offers to pay fifty per cent of the cost of improvement. It also provides that thirty-five per cent of the cost shall be a general county charge, and the remaining fifteen per cent must be borne either by the town in which the road is located, or by the owners of adjacent lands. It should be constantly kept in mind that prior to the year 1898 the town had to pay the entire cost of any highway improvement within its limits, instead of having to pay but fifteen per cent, as above mentioned.

It is thus seen that the state provides, through the Higbie-Armstrong law, the necessary machinery, but it has left to the option of each county as to whether or not the machinery shall be placed in operation. If the county desires to accept the invitation to have any particular portion of road improved, the county,

through its board of supervisors, requests the State Engineer to survey the road and to prepare plans, specifications and an estimate of the cost of the improvement. When the plans and specifications have been prepared by the State Engineer they are submitted to the board of supervisors, and if satisfactory, they are approved by them and an appropriation is made for the county's share of the cost. When the state's share of the cost is made available by the Legislature, a contract for the improvement of the road is awarded to the lowest responsible bidder, after due advertisement for two weeks in a paper published in the county seat of the county wherein the road is located and in other state papers. The town or county may bid for the work, and if they are the lowest bidders, may take the contract and construct the road and have the state pay one-half of its cost.

Under the Higbie-Armstrong law, up to May 1, 1905, 5,500 miles of road have been petitioned for by the boards of supervisors of fifty counties.

2,900 miles of road have been surveyed.

Plans for 2,100 miles of road have been prepared by the State Engineer.

The plans and specifications for 1,750 miles of road have been approved by the state and county, and the county's share of the estimated cost has been appropriated.

700 miles of road have already been improved or are now being improved.

\$6,300,000 of state and county money has been expended since 1898 in surveys, plans and construction.

Comparison of progress during period in which the State Aid Law has been in operation in New York State, January 1, 1905.

DURING YEAR.	Total State appropriations.	Total appropriations by counties.	Total mileage covered by first petitions to date.	Total mileage of roads adopted by counties.	Total mileage of completed improved roads.
1898.....	\$50,000	\$63,872	502	21	0
1899.....	50,000	42,876	157	9	5
1900.....	150,000	431,227	155	130	35
1901.....	420,000	1,055,874	485	247	20
1902.....	795,000	1,748,115	1,106	418	126
1903.....	600,000	2,198,623	1,728	427	112
1904.....	1,108,265	2,032,855	1,323	422	158
Total.....	\$3,173,265	\$7,573,442	5,466	1,674	456

One-half of the necessary funds for the improvement of 1,674 miles has been provided by the counties within which the several roads are located. The state has appropriated, up to January 1, 1905, sufficient money to provide for its one-half of 704 miles of this 1,674, leaving 970 miles yet to provide for. Of the 704 miles, 456 are completed and in use and about 248 miles are now under contract and will be completed early this year (1905). The 970 miles will be taken up for construction as soon as sufficient funds are provided by the Legislature.

By the terms of the Fuller-Plank law, enacted in 1898, the state invites every town to improve its less important roads; to abandon the inefficient, labor-tax system of maintenance; and to substitute the money-tax system of maintenance for all of its roads. As an additional inducement for the towns to accept this invitation, the state offers to pay an amount equal to 50 per cent of the amount levied for the repair and permanent improvement of the highways of each town.

The voters of 416 towns have decided to accept this invitation and have adopted the money system of maintenance. These towns contain about 36,000 miles of road, or nearly one-half of the roads of the entire state. They also contain the most intelligent, progressive and influential people of New York state. The rapid progress made during the last seven years in the number of towns adopting this law is shown in the following table:

YEAR.	Number of counties benefited.	Number of towns receiving State aid.	Number of miles of highways under the money system.	Amount of State aid paid to the towns.	Amount Expended by towns.
1899	8	43	3,696	\$34,517 00	\$138,070 00
1900	14	75	6,497	54,057 00	222,767 00
1901	21	100	7,521	67,655 00	269,994 00
1902	24	139	11,681	102,509 00	419,491 00
1903	44	258	24,372	272,249 00	672,734 00
1904	51	370	30,952	393,493 00	917,873 00
1905	54	416	36,100	483,355 27	1,062,803 22
Total .....	.....	.....	.....	\$1,407,835 27	\$3,703,732 22

Section 55-c of the highway law, enacted in 1904, requires commissioners of highways, in the towns of the state which have adopted the money system of highway tax, to comply with the directions of the State Engineer and Surveyor, and in a

thereto with the plans, specifications, rules and regulations of the county engineer, if there be one, when approved by the State Engineer and Surveyor, for the repair and maintenance of the highways thereof; and the State Engineer and Surveyor may, by notice to the Comptroller, cause him to withhold the moneys otherwise due from the state, under section 53, from any town in which the highway commissioners shall have failed to comply with his directions.

Acting under this law the State Engineer proposes to require in the future that the money be expended in these towns in the manner provided for in the agreement between the highway commissioners and the members of the town board, and such agreement must be on file in the State Engineer's office. He also proposes to require that a system of accounting and reports be made to him annually, showing precisely where and when all moneys are expended for labor or materials by each highway commissioner during the preceding year, and to whom said moneys were paid. A copy of this report will be placed on file in the offices of the county clerk and of the town clerk for the information of any citizen interested in the matter. The condition of the roads and the methods of administration pursued by highway commissioners will be made the subject of an inspection on the ground by competent men at least once a year and as much oftener as is possible.

The State Engineer desires the support and co-operation of all citizens and officials interested in the improvement of the highways of this state, to the end that the million and one-half dollars now expended annually by the towns and by the state in the 416 towns under the money system may be spent to the best advantage and with the highest degree of efficiency and skill.

Another important law recently enacted is section 55 of the highway law, permitting the board of supervisors of each county to appoint a county engineer or county superintendent of highways. Acting under this law, the following eleven counties have appointed a county engineer or county superintendent of highways: Dutchess, Erie, Herkimer, Monroe, Orange, Rockland, Ulster, Westchester, Oneida, Onondaga and Lewis.

One of the most important features of the Higbie-Armstrong and Fuller-Plank laws is the principle of state aid to the rural towns in the construction and maintenance of their highways. Instead of the whole cost of improving and maintaining the 74,000 miles of wagon roads being paid by less than 20 per cent of the population and assessed on town property aggregating less than 10 per cent of the total valuation of the state, only 15 per cent is assessed directly upon the town property under the Higbie-Armstrong law; the 35 per cent assessed upon the counties is distributed upon all the wealth in the cities and incorporated villages located within the county. Under both laws the portion paid by the state, under the system of indirect taxation prevailing in New York state, is almost entirely paid from the taxes on corporations, decedents' estates, the liquor tax, stock transfer tax and the mortgage tax.

In nearly all of the European countries where the highways are in good condition, national or state aid in the construction and maintenance of roads, in one form or another, is given.

France, with a much smaller area than the single state of Texas, has expended over \$650,000,000 in improving her main wagon roads alone.

In the United States, New Jersey, in 1901, first started the principle of state aid in the construction of country wagon roads, paying $33\frac{1}{3}$ per cent of their cost. This state has also abandoned the labor-tax system of maintenance and adopted the money system. The total expenditure by the state of New Jersey to date has been about \$1,800,000, and by its counties and towns, about \$5,800,000.

The state of Massachusetts in 1903 adopted the principle of state aid, the state paying 75 per cent of the cost of the improvement. Massachusetts also maintains her roads under the money-tax system. The total expenditure by the state to date has been about \$4,200,000, and by the counties and towns, about \$1,400,000.

In 1895, Connecticut adopted the principle of state aid in the improvement of her rural roads, and pays $66\frac{2}{3}$ per cent of the cost of improvement. The state has paid about \$1,600,000, and the counties and towns, about \$1,000,000.

In 1895 a state highway department was created in the state of California, but no state-aid law has yet been adopted. In the report of the highway department for 1904, however, an act was recommended to the Legislature which is almost a verbatim copy of the Higbie-Armstrong state-aid act. It is of interest to know that in California the state has established a large stone-crushing plant at its state prison at Folsom, where all the labor is furnished by convicts and the crushers are run by water-power. The product of the stone-crushers is used to improve the roads, and is furnished at a much lower cost than would be possible from any other source. In California over 2,000 miles of country roads, 550 miles of village and city streets, and over 1,000 miles of railway road-bed have been improved by the application of petroleum. California, by its proposed state-aid law, pays 40 per cent and the county 60 per cent of the cost of road improvement; the 60 per cent is subdivided by the payment of 20 per cent by the road district; if the work is done upon petition of property owners, the 20 per cent is paid by them.

The state of New York in 1898 adopted the principle of state aid as is described more in detail elsewhere in this paper.

A state highway department was created in Vermont in 1898, its duties being to have a general supervision of the expenditure of the state-aid funds for highway improvement. A state tax of five cents on the dollar is assessed for the support of highways. The average annual expenditure of state funds in Vermont for highway improvement is about \$90,000.

In 1905 a highway department with an engineer at its head was created in the state of Maine for the purpose of investigating the subject of the improvement of public highways.

Rhode Island adopted a state-aid act in 1902, establishing a state department of highways and has since appropriated annually for highway improvement \$100,000.

In 1895, the state of Pennsylvania adopted an act providing for the general improvement of public highways, but made no provision for state aid. In 1903 the present Pennsylvania state-aid law was enacted, which closely resembles the principles contained in the Higbie-Armstrong state-aid act. The state contributes 66 $\frac{2}{3}$ per cent of the cost of improvement, the town,

16 $\frac{2}{3}$ per cent, and the county, 16 $\frac{2}{3}$ per cent. The first appropriation carried by the state-aid act in Pennsylvania was \$6,500,000.

Delaware created a state department of highways in 1903 for the purpose of improving public highways, the state paying 50 per cent of the cost of the work and the counties the remainder. The annual appropriation is about \$15,000.

In 1905 a commission was appointed in Illinois for the purpose of investigating the subject of the creation of a state highway department, and the report of the commission recommends the adoption of a law very closely resembling the Higbie-Armstrong law in this state. This bill carried with it an appropriation of \$250,000, and provides for the payment by the state of 50 per cent of the cost of improvement, by the county 25 per cent, and by the towns the remainder. The roads, after completion, are to be maintained by the town within which they are located, and in case of neglect further state aid is refused. The authorities of penal or reformatory institutions in the state of Illinois are directed by that act to prepare and place upon cars, upon the requisition of the state highway department, such road-surfacing material as they can produce, this material to be used only for surfacing roads improved by state aid, except that payment to the railroads for transportation may be made in the form of material which can be used for ballasting purposes.

New Hampshire adopted a state-aid act in 1905, appropriating \$125,000 annually for the work, and provided for the appointment of a State Engineer. The act provides that each town shall, out of the moneys annually raised for highways, set apart an amount for permanent improvement varying in the several towns in accordance with the assessed valuations thereof, and that in sections where state aid is desired the county shall also raise an annual sum equal to 60 per cent of the amount so set aside for permanent improvement. The state will then contribute to the several towns an amount based upon the assessed valuations thereof and, therefore, varying in different towns. All roads improved by state aid, shall be maintained by the local authorities under the supervision of the state, and where maintenance is neglected, the state may do the work and charge the cost upon the towns.

The state-aid act adopted by Maryland in 1904 was an embodiment of the laws of New York, Massachusetts, New Jersey and Connecticut, and provides for the annual appropriation of \$200,000. The original cost of the work is borne by the county, which is afterwards reimbursed by the state to the extent of 50 per cent. Where the improvement originates with the property owners they are assessed 10 per cent of the cost. All improved roads are maintained by the local authorities, and where this maintenance is neglected, further state aid is refused. The amount of state aid is divided among the counties in proportion to their mileage.

The state-aid act adopted by the state of Ohio in 1904 is modelled very closely upon the Higbie-Armstrong act, its main provisions being along the same line, and its phraseology, in many sections, identical. The state pays 25 per cent of the cost of improvement, 75 per cent being made a county charge in the first instance, which is apportioned as follows: 25 per cent of the entire cost is a town charge; of this 10 per cent is paid by the whole town, and 15 per cent by the abutting property owners. The improved roads are maintained by the local authorities.

The states of Iowa, Michigan and North Carolina have established state bureaus for the purpose of collecting and disseminating information relating to highway improvement, but have not as yet adopted a state-aid law.

IMPROVEMENT OF WAGON ROADS.

In considering the best means of improving the wagon roads of New York state the problem may be divided into three subjects:

(1) Location and grades, (2) drainage and foundation and (3) surfacing. What is said and done relating to the first two subjects is applicable to all the roads of the state; a surface may be added at any time and may be anything that the traffic conditions, the funds available or the materials available, indicate as most desirable.

LOCATION AND GRADE.

In constructing an entirely new road its proper location is usually first considered and is of the greatest importance. In

improving the roads traversing a country that has been settled many years, as is the case in our state, changes in the location of established roads are usually opposed by the owners of property abutting the old abandoned roads and frequently by other local interests. Often the best solution of the problem is to cut the top of the hill and fill at the bottom on the old location to the extent required to obtain the maximum grade. Where this grade cannot be obtained by a reasonable amount of excavation and embankment, a new location is adopted, if one can be found that is satisfactory.

Whenever an opportunity exists to improve the alignment or grade, to shorten distances, to avoid unnecessary crossings of railroads or to decrease the cost of maintenance by adopting a new location, it should be done, if the damage to abutting property owners is not too great.

If a large amount of money is expended in improving the drainage and surface of a road on a faulty location, it is usually impossible to get a proper location at any later date. The grade should be reduced to a maximum of 5 or 6 per cent, or as near thereto as may be possible, in order to permit heavier loads and thus to reduce the cost of wagon transportation, and also to reduce the cost of maintaining the road. The advantages of improving the road surface on the easy grades and permitting heavier loads there, cannot be fully utilized unless these heavier loads can be hauled up the steepest grade on the road with the same horse-power used on the easier grades.

SURFACING.

In providing a road surface for the wagon roads of New York state it is impossible to treat all of the roads alike. The amount and character of the traffic differs widely. The character of the local surfacing materials available differs in various parts of the state and the ability of the several towns and counties to pay for the construction and maintenance required for the various classes of road surfacing is different in every county in the state. For instance, the assessed valuation per mile of road varies from \$3,793 in Sullivan county to \$208,435 in Westchester county.

It is often a serious question on roads with light traffic in poor towns, whether to use an indifferent local material which is available near the road to be improved, with the idea that defects in the road surface can be quickly and cheaply repaired under a proper system of maintenance by the use of local material, or to provide a first-class road surface at greater expense for construction and maintenance with imported trap-rock or hard limestone.

Estimates and descriptions of the various classes of road surface are given on pages 506-518.

As authorized by section 55-a of the highway law, the board of supervisors in each county of the state, should divide the roads of the county into two classes,— first-class and second-class roads.

First-Class Roads.

First-class roads are to consist of the main traveled roads of the county, leading to, and connecting, the principal centers of population. These roads should be petitioned for and improved under the Higbie-Armstrong law as rapidly as possible. They should have their grades reduced to a maximum not exceeding 6 per cent, except in special cases. Their location should be improved wherever possible at a reasonable cost and without interfering too greatly with vested interests. The drainage of these roads should be made as nearly perfect as possible. They should be provided with as good a surface as the amount, character and importance of the traffic requires, and the wealth of the town and county permits.

It is estimated that these roads amount to about 10 per cent of all the roads in the state, or about 7,400 miles, of which 2,900 miles have been surveyed and 700 miles improved or placed under contract.

The provisions of the Higbie-Armstrong act are general enough to permit the improvement of these highways in any manner that may be desirable, either by an earth-surfaced road at a cost of from \$1,500 to \$3,500 per mile, a gravel-surfaced road at from \$2,500 to \$5,000 per mile, or a macadam-surfaced road at a cost of from \$8,000 to \$10,000 per mile; or even, if thought desirable, a vitrified brick pavement or a steel rail track can be laid, under the law, as it stands.

Second-Class Roads.

Second-class roads are to consist of all roads other than those designated as first-class roads. They should be improved and maintained under the Fuller-Plank act by the highway commissioner, who should work under the directions of the county engineer or county superintendent of highways, if there be one, in a manner approved by the State Engineer, and which will secure the best possible results with the money and materials available. They should have their grades reduced to a maximum not exceeding 10 per cent, have their drainage perfected, and be placed generally in as good a condition as the funds at the disposal of the highway commissioner will permit. It is estimated that these roads amount to about 90 per cent of the whole, or about 66,600 miles.

Nearly two-thirds of the towns which have adopted the money system have a valuation of less than \$1,000,000 each. These towns can raise as much money as they wish for a highway fund, and the state will add to it 50 per cent of the amount raised, thus enabling them to place their roads in a much better condition than they could otherwise afford.

The cost, including engineering, advertising and all expenses, of improving the 700 miles of road already constructed and under contract under the Higbie-Armstrong law, has been about \$8,000 per mile. The cost of 424 miles of completed macadam-surfaced roads alone is about \$8,500 per mile. The cost of the gravel and shale-surfaced roads alone is about \$2,000 to \$5,000 per mile.

In the improvement of a road with the average amount of grading and with no unusual or extraordinary conditions to be considered,

	Estimated cost per mile in New York state.*
The cost of the necessary grading to secure proper grades and drainage varies from.....	\$800 to \$2,000
The cost of concrete and masonry in culverts, small bridge abutments, retaining walls, and paving for gutters, etc., varies from.....	500 to 1,000
The cost of wooden guard railings, ditch crossings, underdrains and other small accessories is about	200 to 500

The work in the above items is essential for the proper improvement of the average country road in New York state, and when completed, it is what is done in building an improved, earth-surfaced road. Of course, the best grade and form and the most perfect system of drainage for an earth-surfaced road is the best preparation for a gravel, shale or macadam road, should any of these surfaces be added at a later date. The cost of whatever surface is provided must be added to the cost of the earth-surfaced road in estimating the total cost of any other kind of improved road.

Estimates of the Approximate Additional Cost Per Mile of Various Road Surfaces.

An earth surface	Nothing.
A gravel surface 6 inches thick and 14 feet wide, requiring about 1,500 cubic yards of gravel per mile, adds from.....	\$1,000 to \$1,500
A shale surface 6 inches thick and 14 feet wide, requiring about 1,500 cubic yards of shale per mile, adds from.....	1,300 to 1,500
A macadam surface 6 inches thick and 14 feet wide, requiring 1,500 cubic yards of macadam rolled in place, adds from.....	4,500 to 6,000
A paving-brick surface 8 feet wide laid on a broken-stone and sand foundation 5 inches thick, with broken stone 9 inches thick and 2 feet wide on each side, held in place by a wooden curbing, thus making a hard surface 12 feet wide of brick and macadam, adds from.....	10,000 to 21,000
A paving-brick surface 14 feet wide laid on broken-stone and sand foundation with stone laid flush with surface of brick, adds from	20,000 to 25,000
A paving-brick surface laid on concrete foundation 6 inches thick with stone curb, adds from	25,000 to 30,000

A granite-block surface 14 feet wide on sand foundation with stone curbing, adds from..	25,000	to	30,000
Sheet-asphalt surface 14 feet wide on a concrete foundation with stone curbing, adds from	25,000	to	30,000
Block-asphalt surface 14 feet wide, blocks laid flat on sand foundation with stone curbing, adds from.....	25,000	to	30,000
Block-asphalt surface, blocks laid flat on concrete foundation with stone curbing, adds from.....	30,000	to	35,000
An oil-surfaced road would add in the first two years, from	1,600	to	2,300
Single-track steel-wheelways, with paving brick between and macadam three feet wide each side of wheelways, making a total width of macadam, steel and paving brick of 12 feet, would add from.....	15,000	to	17,000

If special-drainage plans, telford or gravel foundation in sub-grade, an excessive amount of grading, masonry, paving, guard-rail or other extras are required, their cost should be added to the above figures.

The average cost of all engineering work on the roads, including surveys, plans, estimates, supervision and inspection during the construction, is about 10 per cent of the contract price. The average cost of making surveys is about \$50 per mile. The average cost of preparing plans, specifications and estimates is about \$50 per mile.

Earth Roads.

Where the traffic is light and the soil is gravelly or of such a nature that, when properly drained, a fairly compact, smooth surface can be maintained, and where a better road can not be afforded, the plans for the improvement of the road may properly provide for only an earth surface. Roads of this class, under capable, efficient maintenance, may be fairly satisfactory for light traffic, except during the spring and fall and through long rainy

periods, when it is difficult, and nearly impossible, to keep them in proper condition.

There are 22 counties in the state whose valuation per mile is less than \$15,000. In these counties the number of acres per mile of road varies from 282 in Yates to 927 in Essex and 2,937 in Hamilton. The population per mile of road varies from 13 in Hamilton to 36 in Clinton and Cattaraugus.

It is possible that a considerable portion of the roads located in these poorer counties and some of the roads in poor towns in the richer counties where the population per mile of road is low, and where the traffic is light and not very important, might at first be improved with an earth surface only, and gravel, shale or macadam could be added later when desired.

The grades of these roads could be improved and an adequate system of drainage provided at a cost varying from \$1,500 to \$3,500 per mile.

Some roads have been improved in this manner under the Higbie-Armstrong law and have been fairly satisfactory. The traffic on these roads is light and the soil was of a gravelly nature.

The surface of a sand road may be improved by adding a layer of tough clay or loam and mixing it with the sand by the use of a harrow, or some other method, and *vice versa*, the surface of a loam or clay road may be materially improved by adding a layer of sand and thoroughly mixing it with the loam and clay. After this treatment the road should be thoroughly rolled. A number of sand roads on Long Island have been greatly improved by the towns in this way.

Shale-surfaced Roads.

The argillaceous shales which, under road traffic, turn into clay and mud when exposed to the elements, are worthless as road surfaces and should never be used.

Hard, tough, arenaceous shale, possessing some of the qualities of soft sandstone, has been used, without passing it through a stone-crusher, in surfacing some of the roads in Orange county. In most cases it was obtained in the roadway where hills were cut down and steep grades reduced. After the road was graded it was spread on the surface about eight inches in thickness and

rolled with a ten-ton road-roller. The interstices were filled with fine gravel and a thin layer of it was spread over the surface, after which it was again sprinkled and rolled. This was done at a moderate cost and it made a cheap road which was fairly satisfactory for three or four years. During this time the traffic had worn it so the surface was uneven and so thin that it broke through in the spring in many places, making resurfacing necessary. This was done with shale at a cost of about \$1,000 per mile. Where gravel of good quality or suitable stone for macadam cannot be found, if only a cheap road is desired, the use of shale of the proper quality is sometimes advisable. Where a shale of a suitable quality can be found in or near the road to be improved, a shale surface can be built at a cost of from \$2,800 to \$5,000 per mile. About 15 miles of shale-surfaced roads have been built during the last four years in Orange county under the Higbie-Armstrong law.

Gravel-surfaced Roads.

Where gravel of a suitable quality and in sufficient quantities can be found near the road to be improved, it is desirable to use it as a surface for a considerable proportion of our country roads, where the traffic is not too heavy.

There have been about 75 miles of gravel-surfaced roads improved under the Higbie-Armstrong law up to the present time. These roads are located in Columbia, Orange and Rensselaer counties. Wherever the traffic has not been too heavy and the gravel has been of a suitable quality, they have proved satisfactory. The great difficulty, however, is to find gravel of good quality near the road to be improved. There are many different kinds of gravel, varying widely in quality and in value for road surfacing. The word is usually used to designate any collection of pebbles, or fragments of stone, mixed with more or less sand, clay or loam, which has been brought together by water or ice. The glacial deposits come either directly from the ice, or from water resulting from melted ice, or a combination of both. The deposits from the ice alone are usually unassorted, and the pebbles and boulders occur embedded in a mass of clay or mud. The size and shape of the pebbles depend largely upon their hardness and the length of time they have remained in the water or ice.

The pebbles may consist of any of the numerous varieties of rock, although granite, quartzite, limestone, sandstone, slate or shale are most common. The pebbles may range in size from grains of sand to boulders a foot in diameter. When used for road work all pebbles over one inch in diameter should be screened or raked out. If the gravel is spread in two courses, the pebbles of the bottom course may be as large as two inches in diameter. All sand, clay or loam in excess of about 20 per cent required for binding purposes should be screened or washed out. The gravel of lake and stream deposits is usually cleaner, smoother and more rounded than that deposited by the ice glaciers. Lake and stream gravels are usually composed of pebbles which have come from the rock of the adjacent country or from older glacial deposits. The gravel deposited by water is frequently assorted, the pebbles being in one place and the clay and sand in another. Where the pebbles comprising the gravel are of shale or other soft stone, the gravel will soon become dust and mud under the traffic and is not worth hauling any considerable distance. Where the gravel is half sand or loam, it is a waste of money to haul it to the road. If the pebbles are of the proper size and are hard, tough and durable, it sometimes pays to screen out the sand and loam at the pit, and thus avoid the expense of hauling useless materials. It costs as much per mile to haul a load of gravel as it does to haul a load of broken stone, and the stone will last longer; also, if the stone is near the road and the gravel some distance from it, it is more desirable to crush the stone and use it for building a macadam road than to haul the gravel from the greater distance.

In a suitable gravel, the fragments of stone should be hard, tough and durable. Their size for the surface should not exceed one inch in greatest dimension. The larger stone should be screened out at the pit or raked off after being placed on the road, and used to form the foundation. The several sizes should be so proportioned that the smaller stone are sufficient to fill the interstices between the larger stone, and the gravel should contain sufficient amount of binding material to fill the smaller interstices, so that when compacted it will form one solid, impervious mass. This binding material may be clay, loam, sand

or sandstone, or some other material that is fine enough to fill all the voids and make the finished gravel surface, when properly drained, crowned and shaped, impervious to water.

The proportion of binding material should not exceed the amount required to fill the interstices. In general this should be not more than 15 or 20 per cent of the total gravel used. All in excess of this is only a damage to the road.

For the travel on country roads distant from centers of population, gravel and shale surfaces are satisfactory, providing a reasonably good quality of shale or gravel can be found near the work, but for the heavy travel on roads near cities and larger villages, macadam, even at a considerably increased cost, gives better results.

A decision in any particular case as to which class of road is preferable can be reached in the following manner:

Gravel rolled in place on the road can be furnished for about eighty-five cents per cubic yard, with an average haul of one mile; for \$1 per cubic yard, with an average haul of one and one-half miles; and for \$1.25 per cubic yard, with an average haul of two miles.

At an average cost of \$1 per cubic yard, a mile of gravel road will cost about \$3,500 less than one mile of macadam highway constructed similarly in every respect except in the surfacing.

Money can usually be borrowed by a county or town at the rate of 4½ per cent and based on this rate of interest the state, county and town will save annually about \$157.50 per mile, which should be sufficient to maintain properly a mile of gravel road.

A gravel road can be more quickly and easily repaired than a macadam road, if the gravel can be obtained near the road, and does not ravel out in dry weather like a macadam road. This matter is worth taking into consideration, especially if the road is located where broken stone for maintenance is expensive and difficult to obtain.

Shale and gravel-surfaced roads must have the best possible system of maintenance to be satisfactory. In general they are suited to light-traffic roads which are not located adjacent to cities and large villages. It is advisable to construct a gravel- or shale-surfaced road only when these materials can be found near

the road and are of a suitable quality and in sufficient quantities. Under these conditions a gravel road can be constructed at a cost of from \$2,500 to \$5,000 per mile.

Macadam-surfaced Roads.

John Loudon MacAdam, who was born in Scotland in 1756, and who passed his youth in the United States, originated and successfully practiced for many years the system of road making and repairing which bears his name. The distinctive feature of his system, the value of which has been demonstrated by its universal trial for over a century, was to substitute small, angular stone about two inches in their largest dimension, for the large rounded stone up to that time generally used in road making and repairing. In his time the stones were broken by hand, but since his death the stone-crusher and steam road-roller have been invented, and they are now considered indispensable in macadam road construction. These cheapen and facilitate construction and change methods and details, but the general principles of location, drainage, surfacing, etc., practiced by MacAdam a century ago, are practiced now in building macadam roads in New York state.

Thousands of millions of dollars have been expended in building macadam roads in all the countries of Europe and in their colonies, in and near the cities and villages of the United States, and also in recent years on the country roads of New Jersey, Massachusetts, Connecticut, New York and other states.

The macadam roads constructed in New York state have not been experiments. They have been built on the same general principles that have been practiced all over the world for over a century under similar climatic and other conditions to those prevailing in this state.

In the effort to meet the clamor of local officials and others for cheap roads, some of them may have been built too cheaply, and on a very small portion of a few of them six inches of macadam may have proven to be insufficient, also defective places in the subgrade may have been developed by reason of quicksand or want of proper drainage, but in all cases where the drainage has been kept effective and the road has been properly maintained

the macadam roads built in this state have met every expectation of men who knew just what had been accomplished under similar conditions elsewhere with this type of road surface.

In the adoption of an economical thickness of macadam New York has followed the practice of Massachusetts and of other places, which is to make the road surface about six inches thick, unless there is reason to think that this will be insufficient; then, after construction and use, if a few places, aggregating a very small percentage of the total length of the road, develop holes or depressions, to make the necessary repairs with the other work of maintenance.

This avoids wasting the excess of stone over six inches at all places where six inches proves in practice to be enough, which is usually the whole, or nearly the whole, length of the road. Many people expect a macadam road, costing \$8,500 per mile, to be as durable as a brick, asphalt or granite-block pavement, costing from \$26,000 to \$30,000 per mile.

Broken stone, even of the best quality, is not an ideal material for a road surface for very heavy traffic, especially if that traffic is carried on narrow tires. On many roads of this state it is impossible to get stone of the best quality at a reasonable cost, and it becomes necessary to take the best stone available in the locality where the road is to be constructed.

In the spring, when horses are sharp shod, and also during dry weather, any macadam road will ravel more or less during its first or second year, and the loose stone will lie on the surface, unless the road is kept sprinkled or covered with a layer of small stone, screenings or some other fine material.

Any macadam road will in time, if forced to carry heavy traffic on narrow tires, develop ruts, holes and depressions in its surface, especially where the wagons all follow in the same track.

It is a well-known fact that any macadam surface carrying heavy traffic will wear away from the effects of the traffic, wind, rain and other causes from one-quarter inch to one inch or more every year, the amount of wear depending upon the character of the stone used and the traffic it carries. This wearing is seldom uniform over the entire surface, and the road, consequently, becomes more or less rough.

All this goes to prove that a macadam surface must be properly maintained if it is to remain very long in good condition.

In addition to perfecting the drainage, repairing the ruts, holes or other defects that may develop from the action of the elements, traffic, etc., the macadam surface should be covered with a layer about one inch in thickness, of three-quarter-inch stone of the best quality to be obtained, as frequently as the amount and character of the traffic make it necessary. The principal defects that have developed on a very small portion of the macadam roads of the state have been due to the fact that, by reason of inexperience, lack of funds or other causes, the roads have not been properly maintained by the local highway commissioners charged with that duty. Over 95 per cent of our completed macadam roads, however, are fairly well maintained and are in a satisfactory condition.

Although not so well provided with trap-rock (the best stone for macadam roads) or the means for its general distribution over the whole state as are New Jersey, Massachusetts and Connecticut, in the greater portion of our area some stone suitable for macadam road construction can be obtained. It is to be hoped that within a year a stone plant for crushing trap-rock, operated by prison labor, will be established on the Hudson river. This should enable us to build and maintain our macadam roads much cheaper than is possible at the present time. On a large proportion of our main traveled, or first-class roads, the traffic is too heavy for gravel surfaces, also gravel of a suitable quality or in sufficient quantities cannot be found near the roads. For these roads, without doubt, the macadam surface provides the best solution of the problem.

The cost of the average macadam road is about \$8,500 per mile.

Paving-Brick-Surfaced Roads.

The advisability of providing a paving-brick surface should be considered in the following cases:

First. On those roads where the traffic is heavy enough to wear away a macadam surface at the rate of one inch per year, or more.

Second. On those roads where it is impossible to keep a macadam surface free from ruts, holes or depressions by reason of heavy traffic on narrow tires.

Third. On those roads where the cost of constructing and maintaining a macadam surface is excessive by reason of the long haul for the broken stone. Where it is necessary to pay out a large amount of money for freight charges on broken stone, it may be advisable to pay out this money on the same tonnage of paving brick, which will last longer and cost less for repairs.

Fourth. On those roads where the only broken stone available at a reasonable cost is not suitable to form a wearing surface for a macadam road which is to carry heavy traffic.

When properly constructed the cost of maintenance of a brick surface should be much less than that of a macadam or a gravel surface. It will not ravel out in the spring or in dry weather, and will not be covered with dust or a layer of mud, as is the case on many macadam roads; also the tractive resistance will be less than on a macadam or gravel-surfaced road.

A roadway eight feet wide could be improved with a first-class paving brick, laid on a broken-stone and sand foundation five inches thick, with broken stone two feet wide and nine inches thick on each side, held in place by a wooden curb, making a hard surface 12 feet wide of brick and macadam, at a cost of from \$11,500 to \$15,500 per mile. If a concrete foundation were substituted for the broken stone under the brick, as would be advisable, the cost would be increased from \$600 to \$1,000 per mile. This price is based on the use of a first-class paving brick, costing from \$23 to \$28 per thousand, f. o. b. cars at nearest railroad switch to proposed road, on a haul of two miles from the cars, and on the use of a filling of Portland-cement grout between the bricks.

Steel-Wheelway Roads.

A number of plans and designs for steel wheelways have been suggested during the last few years, none of which has as yet been shown to be a success in actual use.

About 2,000 feet of double-track, steel wheelways were laid in Chicago in 1901, from designs prepared by the office of Public Road Inquiries of the United States Agricultural Department. This wheelway was not a success and has been taken up.

In 1902 a steel wheelway of a much better pattern, from plans prepared by General Roy Stone of the office of Public Road In-

quiries of the United States Department of Agriculture, was laid in Murray street, New York city. These shapes were rolled by specially built rollers at the Carnegie plant of the United States Steel Corporation. Many drivers of teams hauling heavy loads avoided using the wheelway, for the reason that their horses could not obtain a foothold on it. It has since been removed.

Plans were prepared by the State Engineer's office for using this type of steel wheelway on a road improved under the Higbie-Armstrong law in Ulster county. This road had a very heavy quarry traffic, carrying many loads of bluestone, weighing from eight to twelve tons.

The Supervisor of the town and a number of prominent quarry owners, after a careful examination of the steel wheelway on Murray street in New York city, decided that they did not want one like it on their road; they were afraid that horses could not get a foothold on the smooth steel. A macadam road with a trap-rock surface was afterward built instead.

Any wheelway should have a paving-brick or stone-block surface between the tracks and a macadam strip on each side of the wheelways, if used by horse-drawn vehicles. This hard surface costs about as much as the wheelway itself.

When the automobile is perfected and reduced in price to such an extent that it replaces horse-drawn vehicles on our country roads, some form of wheelway may be used with success.

A wheelway made of paving brick was laid on a road near Blasdell, Erie county, in 1902. It did not prove to be successful.

A road improved with a wagon trackway of steel rails, approximately 147 tons per mile, each track one foot wide, with paving brick on macadam and sand foundation between the tracks and with a broken-stone surface three feet wide on each side of the trackway could be built at a cost of from \$17,000 to \$20,000 per mile.

Oil-Surfaced Roads.

On account of the success which has resulted from the use of oil on the roads in some parts of California, great interest is shown in the use of oil for improving road surfaces. In California the saturation of the road surface with crude oil causes the particles to bind together, thus forming a hard compact surface.

dustless surface. The crude oil of that state and of Texas is peculiarly well adapted for this purpose, as it has a base containing often as high as 65 per cent of asphalt. All petroleum will moisten the dust and prevent it from blowing, but an asphaltic base is essential to bind together the loose particles of the road surface. It has been found by experience that the oil surface gives satisfaction only when the subgrade is in perfect condition, and when the surface treated is of a sandy or gravelly formation. When the subgrade is soft or spongy, or when the surface material is dusty loam or clay, heavily loaded wagons will break through the oiled surface. And unless the drainage is perfect, so that water cannot find its way into the foundation of the road-bed, frost will break the oil crust and bad holes and depressions are liable to be formed. In California the dry season is long and hot and the roads become very dusty, and it is in this climate that oil roads are especially suitable, as they then become hardened and dustless. During the rainy season they soften and give much trouble from breaking beneath heavy loads.

In considering the advisability of oiling the surfaces of roads in the state of New York, the effects of our heavy frosts, wet springs and autumns and short dry summers must receive attention. The improvement of roads in this state, where there are heavy rains, where there is so much alternate freezing and thawing, where the winters are so excessively cold, where the seasons are so different, etc., is unlike the same work in California climate. It does not seem probable that the conditions of New York state warrant the general adoption of oiling roads. There has been made a series of careful experiments over a term of years.

The cost of California cost, not including the cost of the oil, per mile, according to the nature of the road, is \$200 or \$300 per mile each year thereafter. In estimating the cost of oiling roads in New York, we must base our estimate on the cost of kerosene or California, as the cost of paraffin base, and the cost of the oil used on the roads. The

transportation across the continent adds greatly to its cost. The price quoted by the Standard Oil Company for oil delivered at Albany is about \$1.30 per barrel, while the same oil at Los Angeles can be purchased at seventy cents per barrel

The cost of an oil-surfaced road here, not including the grading, etc., would be from \$1,200 to \$1,800 per mile, according to the material treated. Another application would be required the second year, at a cost of from \$400 to \$500 per mile, and the maintenance thereafter should not exceed \$100 or \$125 per mile per year.

Application of Oil to Macadam Roads.

The use of oil for the purpose of laying the dust in the maintenance of macadam roads has been practiced in Fayette county, Kentucky, for the last three or four years, and also during the last year in Nassau county, in New York state. The oil used in Kentucky is obtained from the Raglen oil fields in that state. This oil contains about 44 per cent of an asphaltic base and after the surface of the macadam has been swept free of all dust and other loose materials the oil is applied with a California oil-sprinkling wagon. About 400 gallons per mile are used to oil a strip of macadam 12 feet wide. The oil is usually applied at the warmest season of the year, in July, and the traffic kept off for several days after its application. The oil costs in Kentucky about three and one-half cents per gallon. The second year the same operation is repeated except that the quantity of oil is reduced to about 100 gallons per mile.

In Nassau county, in New York state, the oil used is obtained from Pennsylvania and has a paraffin base. Before the oil is applied the entire road is covered with a layer of sand or fine gravel about one-half to three-quarters of an inch in thickness.

The oil is then sprinkled over a width of from 8 to 10 feet with an ordinary sprinkling wagon, having holes in the sprinkler about one-eighth inch in diameter. The amount of oil used varies from 1,000 to 1,500 gallons per mile. The oil costs about three and two-tenths cents per gallon in Nassau county. The total cost of oiling the roads in this manner is from \$50 to \$75 per mile. The use of an oil with an asphaltic base has not yet been tried in Nassau county. There is every reason to believe

that better results could be obtained from the use of the same amount of oil with an asphaltic base, if this variety of oil could be obtained at a reasonable price in Nassau county.

HIGHWAY IMPROVEMENT IN GENERAL.

An immense amount of labor and material will be required to place over 75,000 miles of our roads in good condition, and after they are once placed in a proper condition the rains, winds, frost and other elements, the shoe of horses, the wheels of vehicles, especially those carrying heavy loads on narrow tires, the ignorance, maliciousness, selfishness and carelessness of the people using the roads and owning the lands adjacent to them, will constantly be at work interfering with the drainage and otherwise injuring the roads. In addition, the improper, inefficient and lax methods of administration, from which our highways have suffered for a century, must be changed into a wise, efficient and capable system of highway administration.

The most important feature of the good roads question is the problem of maintenance, for in reality an improved road is but a good foundation which must be constantly maintained. In order to successfully carry on this great work there should be in each town one highway commissioner, and in each county one county engineer or county superintendent of highways. There should be such requirements for eligibility to these positions as to make as difficult as possible the selection of an improper person and to insure, so far as possible, the selection of the best-equipped men that can be found for these positions. The salary should be sufficient to secure and retain competent men, and to permit them to give up all other private work or business, and to devote their entire time and attention to their official duties. They should also be required to give bonds for the proper expenditure of all funds. When competent, capable and reliable men are found, they should be retained as long as their services are satisfactory, regardless of politics or other considerations.

The county engineer or county superintendent of highways should be placed in charge of the maintenance of all roads and bridges in the county, and be held responsible for their condition. He will be powerless to accomplish his important duties success-

fully, nor can he be held responsible for the work under his charge unless he is given full power and authority to have his orders executed promptly and efficiently, and he should also have the power to remove incompetent highway commissioners. Any vacancy thus created could be filled in the same manner as is now provided by law.

The state contributes a large amount of money annually for the maintenance of country roads, most of which is paid by people living in the cities and incorporated villages of the state, who, although they are interested in the condition of the highways have no voice in the selection of town or county officials, except possibly those of their own county. All the people of the state, however, have a voice in the selection of state officials. For this and many other reasons, the work done by the county and town highway officials should be under a general supervision of some state official, and the moneys expended by them should be expended in such a manner as to meet his approval.

To carry on successfully the great task of improving our roads, it is necessary to have strong state, county and town organizations, each under the control of one man, who should be provided with all needful authority to carry on his work. Under this system, the supervision of each road would have the advantage of the experience and knowledge that one man had acquired by long acquaintance with the locality, and also that of another man who had acquired a wider experience and more general knowledge by reason of his familiarity with the larger work and the different conditions prevailing over the whole county; and, in order to insure uniform methods of accounting, discipline and administration, the whole work would progress under the general supervision of a man selected by the people of the entire state. This system resembles somewhat the systems that have been found best and most efficient in adjacent states, and also in those countries of Europe that have the best roads and whose men in charge have had the most experience in their care. It accords more with the system of centralized control and uniform methods which have been found to be most efficient and economical in the management of large, modern, business enterprises.

Over half of the state, including the most progressive portions, has volutarily adopted the money system, and the remainder should be placed under that system of maintenance by an act of the Legislature. There should be a law enacted providing that any man who has refused or neglected to pay his poll-tax shall be disfranchised until such tax is paid.

The present laws, which give a rebate for the use of wide tires, and which authorize the board of supervisors of the county to regulate the width of these tires, do not seem greatly to have curtailed the use of narrow tires. The advisability of enacting a law which will require the paying of a special highway tax on all narrow-tired wagons, capable of carrying over two tons, should be considered, and there should be a law enacted which would prevent private corporations from impairing the value and purposes for which the public highways were created. No electric railway should be allowed on a public highway, unless it is located in such a manner as not to curtail the right of the traveling public. Telephone, telegraph, electric-light and other poles should be allowed on public highways only on condition that the people placing them there refrain from mutilating shade trees or interfering with the rights of the public in any way.

Should the proposed fifty-million-dollar bond issue for highway-improvement purposes be authorized by the people in 1905, the money will have to be equitably proportioned among the counties as shall be determined under general laws. We do not know what these general laws will be, but we have a right to expect them to be equal to or better than the Higbie-Armstrong and Fuller-Plank laws, elsewhere described. If this be the case, the money expended in reducing steep grades, improving location, perfecting drainage, building concrete or masonry culverts with concrete or flagstone tops that need not be renewed, masonry retaining walls, etc., will be permanent improvements that will benefit future generations. The only expenses required in any one season will be those of maintaining the surface of the road and renewing the same when necessary. It is only just that the people who will enjoy the advantages of these improved roads in the future shall help pay for the cost of them.

Nearly all of the money expended in highway improvement is paid out for labor, in some form, or for the materials of stone, gravel and cement furnished within the state.

Massachusetts obtains her money for highway improvement by bond issues, running thirty years, and nearly all nations, states and municipalities throughout the world pay for their permanent improvements by bond issues, and most railroads and other corporations pay for their permanent betterments in a similar manner. It is probable that the 74,000 miles of wagon roads of this state could be reproduced, equal in all respects to their present condition, at an average cost of not to exceed \$2,000 per mile, or a total cost of about \$148,000,000. If we assume that the average cost of each mile of the 15,571 miles of single-track, steam railroad and its equipment in New York state is \$57,675, the total amount of money invested is \$898,000,000. The total cost and equipment of the 3,000 miles of electric street surface railroads, etc., in New York state is about \$470,000,000. All combined would make about \$1,368,000,000 invested by private corporations during the last half century in the improvement of transportation facilities within New York state.

The total amount expended up to the present time by the state of New York for the construction, maintenance and interest charges of the 513 miles of existing canals, the 109 miles of their navigable branches and feeders, and the 321 miles of abandoned canals and their branches and feeders is \$213,000,000.

The amount received by the state from 1821 to 1883 in tolls and other sources of income from the canals is about \$144,000,000, most of the tolls coming from the Erie, Champlain and Oswego canals. In fact, up to the present time, the state has received in tolls from the Erie canal many million dollars more than she has expended on that canal. This amount does not include the cost of about 100 miles of private canals which were used for many years, but are now practically abandoned, nor does it include the many millions of dollars expended by New York state and her cities and by the United States government in improving the transportation facilities in New York harbor, the Hudson river and other waterways and harbors adjacent to the lakes on the borders of the state.

As above described, there has been expended within New York state by private corporations and by the state itself many hundreds of millions of dollars to improve her transportation facilities, and the state proposes to expend \$100,00,000 in order to reduce the cost of transportation on through and local freight, using the waterways connecting the Hudson river with Lakes Ontario, Erie and Champlain. Two railroads alone are now spending more than \$50,000,000 to improve their terminal facilities in New York city. A large proportion of the local or way freight and passengers carried by the railroads and canals of the state, also passes over some portion of the wagon roads within the state. A reduction in the cost of transportation over these wagon roads, which constitute a very important and necessary part of the transportation system of the state, is as desirable as is the reduction of the cost of transportation on the railroads and waterways of the state.

During the past three-quarters of a century all of our thought and energy seem to have been devoted toward cheapening the cost of transportation by railroads and waterways, while the improvement of our common wagon roads has been deplorably neglected. Political economists of all countries and ages have considered that the degree of civilization existing in a state or country is measured by the condition of its highways. When measured by this standard, the Empire State, the most populous and the wealthiest state in the Union, is found to rank lower in the condition of her public wagon roads than most of the countries of Europe or her sister states of New Jersey, Massachusetts and Connecticut. The question before her people now is,—Will she remain behind or will she take a step that will make her public roads and their administration a model for all the other states in the Union, and a source of pride, profit and pleasure to her people for all time?

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